THE
ELECTRICAL REVIEW

Volume CXXVI. No. 3256

Friday, April 19th, 1940

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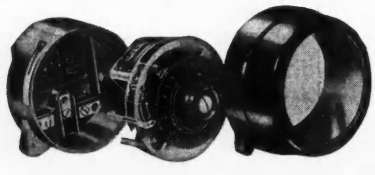

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Generation Prospects

Hold-up of Extensions

LIKE much else, electricity supply has been affected by the war in a way that was not expected by most people. Experience of 1914-18 had suggested that power station resources would be taxed to the utmost to meet the needs of armament manufacture. Nevertheless, the aggregate demand has fallen far short of what it would have been under normal conditions, and serious doubts are expressed in the 1939 report of the Central Electricity Board, reviewed in this issue, as to whether it will pick up materially during the war or even for a few years after. The "black-out" has closed down commercial-display and street lighting, evacuation has deprived many towns of domestic load without influencing appreciably the demand in reception areas, and the curtailment of non-essential industries has reduced the normal power load. What will be the effect of the debilitating "gas-electric" truce remains to be seen.

In effect, the present position is the result of progress made during the past twenty-five years. In 1914 electricity was comparatively little used, so that productive effort had to be turned to the construction of local generating plant, and this often delayed munitions making. Now, owing to its general availability, supply can be obtained generally with little trouble from extensive public systems, and the additional load occasioned by meeting the requirements of our armed forces is a relatively small proportion of the whole.

Grid's Wartime Functions

As the plant capacity budgeted for in peace as necessary to meet the needs of the next few years seems likely to be in excess of requirements, the Board has decided provisionally to hold up most of the new generating plant that would have been required for service after the end of next year. Regarding the Board as a trading concern, that would appear to be the only sound thing for it to do, since it has to meet the charges on surplus plant, and a probable improvement in load factor is of little assistance in the circumstances. As things are, however, the position should be looked at from a different angle. Already the C.E.B. has deviated from its aim of economising fuel by concentrating generation in a few stations, the present need being to ensure reliability of supply in the face of hazards never contemplated when the grid was installed.

Additional duties, such as the emergency transference of energy from one part of the country to the other, in order to avoid congesting the railways with the transport of coal, may well be thrust upon the grid. On the other hand, generating plant cannot be shifted from one part of the country to another. Even if the maximum demand for the whole country does not increase much, it is probable that an unnecessary margin of capacity in one area may be offset by shortage in another. It is possible, too, that the need to manufacture more goods for export may make further calls on our generating resources.

Reliability of Supply

Meanwhile the researches initiated by the Board with the collaboration of E.R.A. are going ahead. One item referred to in the Report is of particular importance just now, having regard to the additional risks involved in transmission; *viz.*, the steady increase in the proportion of faults on the grid which are correctly cleared by protective equipment. In his presidential address to the I.E.E. Mr. Johnstone Wright gave the percentage for 1938 as 88; last year the figure reached 91.

The functioning of the interconnectng system in emergency should cause little concern, and the chief point for argument is how far caution should be exercised in guarding against having—from the commercial standpoint—too great a margin of power station plant. It should be borne in mind that new stations are normally arranged for at least four years, and extensions to existing stations at least three years, in advance of the load.

The grid owes its existence largely, the Report states, to a recognition of the deficiencies in the organisation of the electricity supply industry as a whole during the last war, and it is a material factor in increasing the contribution of the industry to the present national effort. Although the latter is an uncovenanted benefit, since the grid was certainly not constructed with anything of the kind in view, it is the one now uppermost. Organised generation should, therefore, be looked upon, for the time being, as one of the defence services. In view of this, cost (whether capital or operation) cannot be the main consideration.

External Lighting in Daytime

A CASE which came up at Old Street Police Court last week gives prominence to a point which is not generally appreciated. A butcher was summoned for causing a 300-W lamp to be "displayed" outside his premises during daytime. Both the defending solicitor and the magistrate himself were unaware that this was an offence. The defendant pleaded that the light was necessary to his business, and the magistrate appears to have accepted this, although he imposed a fine of 20s. because the police had no alternative but to bring the proceedings. Apparently nobody in the court could give the reason for the regulation against the daytime use of exterior lighting for the purpose of "advertisement or display," which does not merely relate to signs as has been thought. The defending solicitor suggested that it might be for the saving of electricity, but he pointed out that his client could have as many lights as he liked inside the shop. Another matter which requires to be resolved in such cases is where utility ends and display begins.

National Food Campaign

HOWEVER altruistic one may be, it is always satisfying to know, when one is assisting somebody else, that one is doing oneself a good turn too. This happy state of affairs is presented to the electricity supply industry by the National Food Campaign just inaugurated. Not only will the industry be able to help the national war effort by telling consumers what is best for them to eat with a view to their health and pockets and to conserving the food supplies available, but it will also present an opportunity of demonstrating the excellence of electricity for cooking and other domestic services. When the war started many undertakings considered closing, or actually did close their showrooms. Following the general invitation issued by the Ministry of Food for people to attend demonstrations, it seems likely that the difficulty now is going to be to provide sufficient accommodation, and the matter should be looked into by those concerned without delay.

Effective Publicity

FAR from disparaging our gas friends, we must congratulate them upon the activity which they are showing in the Press throughout the country. Their explanation of the way in which gas is helping to win the war is a most effective piece of propaganda which we would like to see equalled by the electrical industry. It is true that electricity is getting a good deal of attention through its participation in the National Food Campaign, but this is somewhat offset by the equal amount of publicity which the gas industry is getting on the same account. What we want is a national *electrical* message stressing, without mentioning gas, the part which electricity is exclusively playing in the national effort.

Quick-acting Fuses

BEFORE fuses of high-rupturing capacity become used to the extent warranted by their merits (as set out by Mr. J. W. Gibson in his I.E.E. paper last week) several points have to be settled. Such fuses possess advantages over circuit-breakers in compactness and absence of voltage rise. In comparison with ordinary types of fuses, prices at present obviously reflect heavy development charges. Then there is the difficulty due to their high fusing factor, with which is bound up the absence of definition of what minimum fusing current means in relation to time. Thus, the Home Office authorities have found that h.r.c. fuses of different makes rated at 300-A may blow at currents varying from 400 to 575 A in half-an-hour and from 475 to 850 A in less than one minute. While operating without trouble under short circuits up to 25 MVA at 400 V, they usually afford inadequate protection against overloads, and need to be supplemented by fuses with more normal time constants. Nevertheless, if the latter are rewirable by the consumer, the whole scheme of protection may be upset. The h.r.c. fuse is presumably the quick-acting type referred to in the I.E.E. Regulations (although it may be argued that they are not necessarily the same), but no definition of either is given. The question suggests itself as to whether the use of silver or any other volatising metal constitutes the last word on the subject.

Rates and Charges

THE Harrogate Chamber of Trade recently sent a deputation to the Corporation to ask for the reasons for a 12½ per cent. rise in electricity charges. The deputation seems to have been satisfied with the explanation that, *inter alia*, the increase would enable £6,000 to be taken for rate relief, which must be cheering news for electricity consumers. A more reasonable attitude has been shown at Whitehaven, where a local paper points out that without increasing charges there can be no rate relief from the Electricity Department. Our contemporary puts the case very succinctly when it says:—

> "But, after all, the electricity department has subsidised the rates for a long time now, and there are many electricity consumers who may feel it is time they had some return. This aspect of the finance problem is made no easier by the fact that ratepayers and electricity consumers are not always the same people."

A Retrograde Step

THERE must be something unsettling as well as stimulating in the seaside air. A week or two ago it was proposed that the Brighton Corporation should withdraw from all Whitley Councils on which it was represented. The proposal, very properly we think, was rejected. Last week the Worthing Council was informed that the Electricity and Waterworks Committee recommended that the Council should withdraw from membership of the National Joint Board and National Joint Industrial Council for the Electricity Supply Industry. In this case the recommendation was approved after the chairman had said that they objected to being dictated to by somebody they had no control over. This contention will hardly hold water, for the Council has as much say as others in the deliberations of the bodies concerned. It cannot be gainsaid that the Whitley system has worked extremely well—particularly in the electricity supply industry—and a return to anarchy cannot be contemplated. We hope that Worthing's example will not be followed and that eventually they will return to the fold.

The B.E.A.M.A. Report

THE annual report of B.E.A.M.A., which we review on page 453, gives the impression that conditions in the electrical manufacturing industry, while perhaps patchy, are, on the whole, not unfavourable. The makers of the heavier electrical equipment are still occupied with a fair volume of normal work, and gaps have been filled by Government orders. On the lighter apparatus side the process of adjustment to war conditions has not been so easy. While the stoppage of imports may help so far as the restricted home market is concerned there is inevitably idle capacity. In an endeavour to obtain useful work for this B.E.A.M.A. has prepared a directory of member firms in need of work, indicating the facilities available, copies of which have been sent to a number of Government Departments. The report stresses the value of a good home market as a sound basis for export trade.

"Cheap and Abundant?"

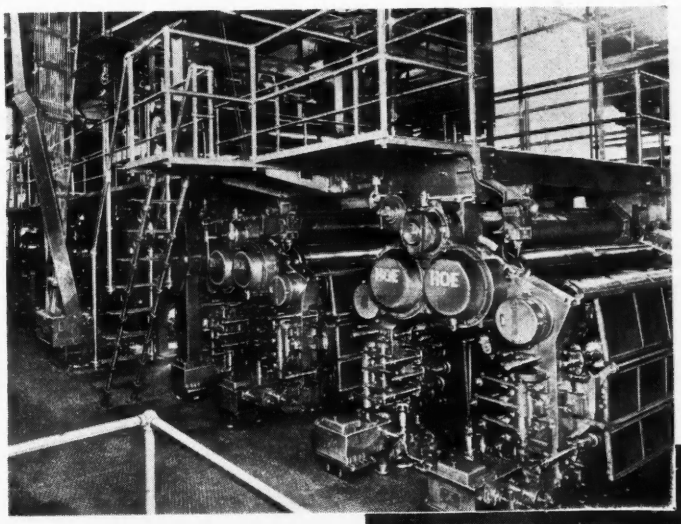
THE Associated Press has discovered a "German scientist" with a scheme for damming the Mediterranean at Gibraltar and between Sicily and Tunis with a threefold purpose: to lower the level of the sea to enable 500,000 sq. miles of land to be reclaimed; to irrigate 300,000 sq. miles of African desert; and to provide electric power for all Europe. He would concede a lock at Gibraltar to enable British ships to get in and out. We suggest that he persuades his Government to clear away the few minor details which prevent the work being started to enable him to get on with his scheme.

HIGH-SPEED PRINTING

DC Unit Drives for Large Newspaper Presses

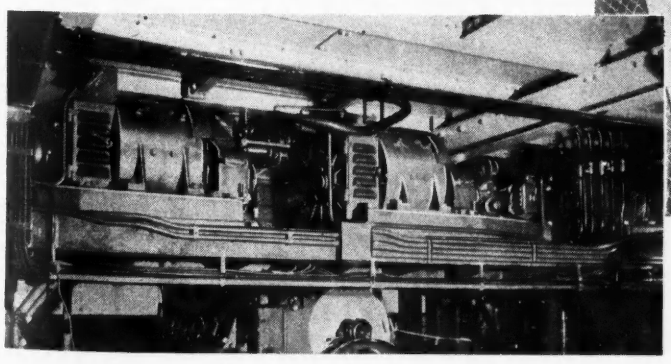
BY the courtesy of the *Evening Standard* we were recently able to see the driving arrangements which have been adopted for the new printing presses so far installed as part of the reorganisation of the printing offices. Hoe "superspeed" presses have been arranged in the formation of five quadruples each consisting of two double-width rotary press units and a folder. The whole installation has a maximum output of 250,000 copies per hour, i.e., 50,000 copies for each quadruple press. This is the equivalent of a cylinder speed of 416 RPM, which is the same as the shaft speed because of the one-to-one bevel gear transmission ratio from shaft to cylinder. The cylinder diameter is 16 in. and the web width 73 in.

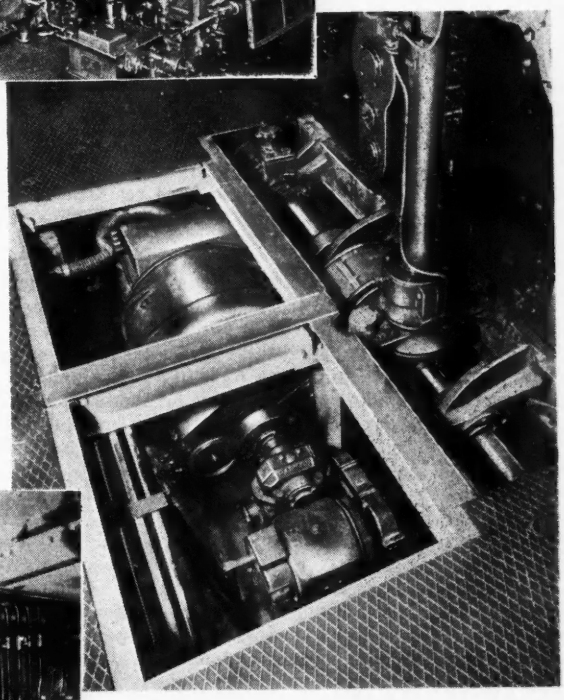
The unit system of driving—a completely separate drive for each rotary press unit and for each folder, making 15 drives in all—was adopted because it was considered to contribute to a better balance of power distribution, developing steadier driving and smooth acceleration; to reduce considerably the size of the shafting and avoid the heavy transmission necessary for driving at only one or perhaps two points; and to provide greater stand-by capacity on account of the fact that the load diversity of the individual units is such that full production can be maintained in the event of failure of any one drive.



One of the presses, consisting of two double-width rotary units and folder seen from the printing cylinder floor

DC driving was adopted mainly because of the availability of that system from public supply. Two-motor type drives have been adopted in all cases because of the severe starting duties called for by the very heavy (solid) cylinders, and the sticky load characteristic of the printing cylinders and inking rollers. Between twice and three-times full-load torque is required for starting. Again, the sheet (newsreel) must be under very steady control when it is fed into the cylinders. Further, fine inching is required when lifting the printing plates from the cylinders in the small space available for manipulation.





A two-motor main drive, looking through printing-cylinder floor, and left, the same drive seen from the reel-stand floor

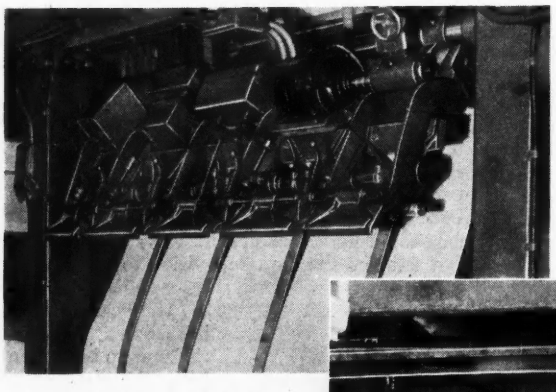
Each main motor has an output of 50 HP, is compounded for good stability, and has a speed range of 750/1,500 RPM imparted to it by means of shunt-field regulation. Contrary to what might be termed popular modern practice, it is a non-fan-ventilated equipment. The idea behind this is that the printing press is so expensive in regard to both capital and running costs that the cost of the motor is of less importance than in many other applications, and also a fan would suck paper fluff from the printing works atmosphere into the motor windings.

Transmission from the motor to the press shaft is by a chain reduction gear with a ratio of 3.6 to 1. This chain transmission embodies special clutches, and the arrangement enables the complete drive to be isolated from the press, say, in the case of a breakdown, leaving the unit to be driven from the remainder of the press group, or the individual unit complete with its motor equipment to be isolated from the main shaft for separate operation when required. Normally both clutches are kept in the engaged position.

Each auxiliary motor has an output of 5 HP at approximately 1,150 RPM, and is coupled to the main motor through a worm reduction gear having a ratio of approximately thirty-five to one and a free-wheel coupling which enables the main motor to overrun and take up the drive. The auxiliary motor is capable of running the press at a maximum cylinder speed of about 10 RPM, and its main purpose is to provide the heavy torque required at starting. It

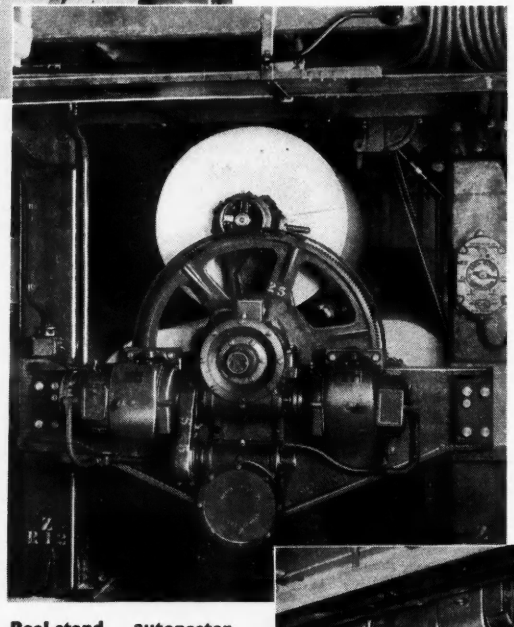
also serves to maintain steady low running speeds for threading webs and make-ready, that is, preparing the press for printing.

From the fact that each of the printing and folder cylinders weighs two tons, it will be appreciated that most of the momentum of the press is at these cylinders, and that it is strongly advisable to apply braking



Web-tensioning equipment on autopaster

direct at the energy sources, that is, at the cylinders. Each cylinder is therefore fitted with an electro-magnetic brake which is applied during stopping, to reduce the shutting-down period to the minimum of 5 or 6 seconds. This means considerable saving in both press time and "white waste" (paper). Further, the natural lag in the "build-up" of the brake contributes to the smooth running of the press. The rotating member of the brake is keyed to an extension of the cylinder shaft while the stationary member is carried on brackets mounted on the press frame. Mounted directly on the press substructure columns and having the same vertical centres as the overhead press frame sides, is a Witton-James bracket-type reel stand which is equipped with an electro-dynamically operated belt tensioning system for web tensioning and reel braking.



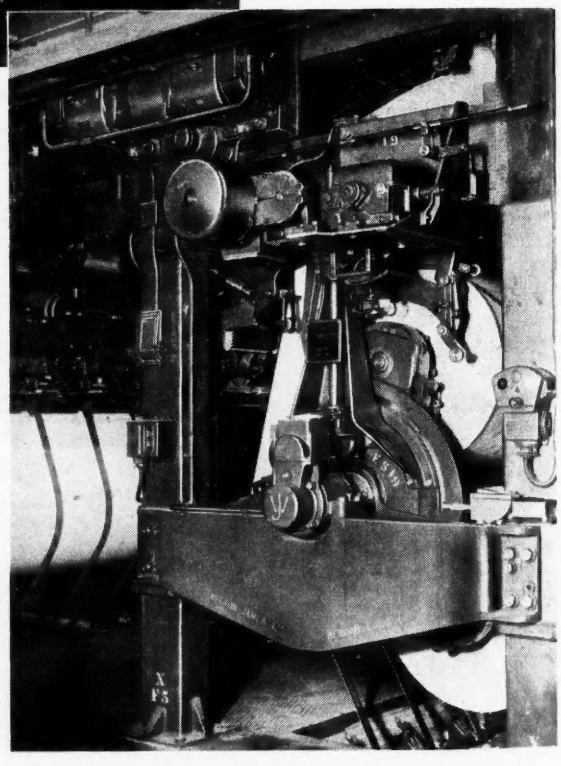
Reel-stand autopaster showing reel-stand and sidelay motors

Each reel stand is of the three-arm type and is capable of taking three full-width reels of 36 in. diameter. The reel stand spiders are adjustable on the main shaft for accommodating full, three-quarter, half and quarter reels in any position. The reel stand rotation for the loading and replacement of reels and the sidelay control of the marginal adjustment of the web is motor operated through push-button control. The web tensioning system, which comprises steel-lined leather belts in contact with the running reel under the control of a differential electro-dynamic tensioning unit, enables any desired web tension to be maintained during the normal running of the press, while special braking is automatically applied during stopping, slowing-down and splicing.

The two very simple electro-dynamic machines of the tensioning unit have a small epicyclic gear box and light chain drive to the belt shaft. The combination is constantly running and is extremely sensitive. A variation in the field value of one of the electro-dynamic machines is set by the 12-point web feed tensioning switch which develops any required belt tension on the reel with appropriate and automatically increased tension for "slow-down" and "quick stop." The web tension is under the control of regulators mounted in a folder pedestal for the centralised control of the press. It is important that web tension, once set, should be maintained constant during the running of the reels. This involves a particularly difficult problem, for example, during stopping, since to obtain this constant tension the reels must be brought to rest at the same rate of deceleration as the press.

The folder pedestal, which affords a central control system at each folder, contains two full control boxes for the press with "inch," "speed-up," "slow down," "stop" and "lock" push-buttons with red and green signal lights. One complete set of controls is provided for normal and one complete set for emergency use, together with the necessary web tension regulators, sidelay controls and pasting indicator lamps. One of these is available for each unit and reel stand which can be associated with the particular folder. The lock provides a safety measure for the operator during make-ready, by preventing the press from being started.

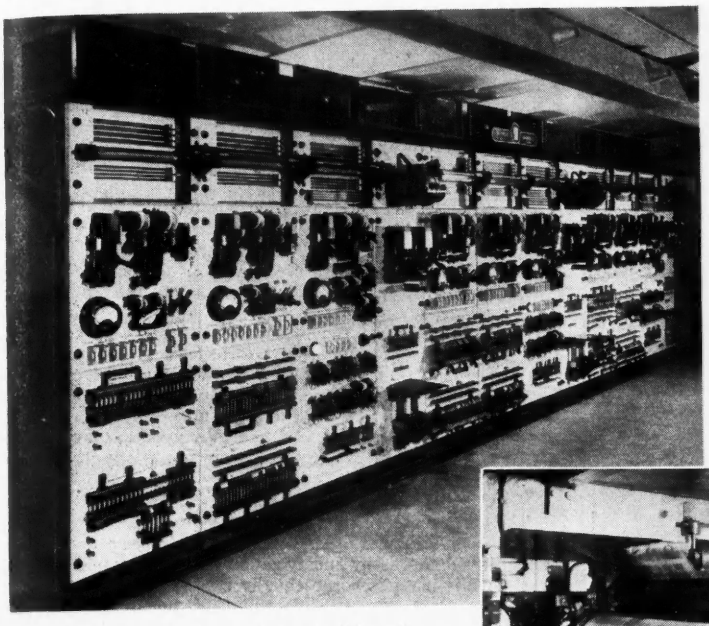
Associated with web grippers situated between the reel stands and the printing units are special web-break detectors. These are of very simple construction, each comprising a balanced aluminium roller carried across the press in a ball-bearing bracket at one end and an aluminium switchbox in ball bearings at the other end. An aluminium finger rests on the running web for positioning along the roller to suit any web width, preferably for a margin run to prevent smearing. The finger rests lightly on the web and on the breakage of the web the finger falls by gravity and operates a switch box. This is frictionless and of the purely rotary type with normally open and closed contacts to operate the



Differential electro-dynamic belt tensioning unit on autopaster

"stop" circuit of the motor equipment and bring this to rest and to energise the solenoids through suitable switchgear for the purpose of operating the

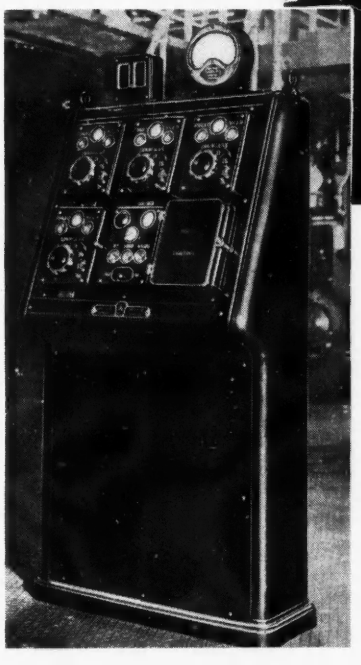
press maker's web-gripping system and actuating slitters. The gripping system holds the paper ready for rethreading, and slitting prevents it wrapping round the printing cylinder should it break at the critical point. Several thicknesses of the paper forcing the cylinders apart would produce very dangerous conditions, and



South line of the main central board

because of this it is important to place the detectors *after* the units with respect to the direction of flow of the paper through the rolls. All the components of this apparatus are locked, chain anchored or pinned to any part dropping into the presses.

Inter-built with the reel stands are Witton-James-Wood autopasters which enable the replacement reel to be joined up with the running web at any speed of the press up to its full output of 50,000 copies per hour, the corresponding web speed being 1,750

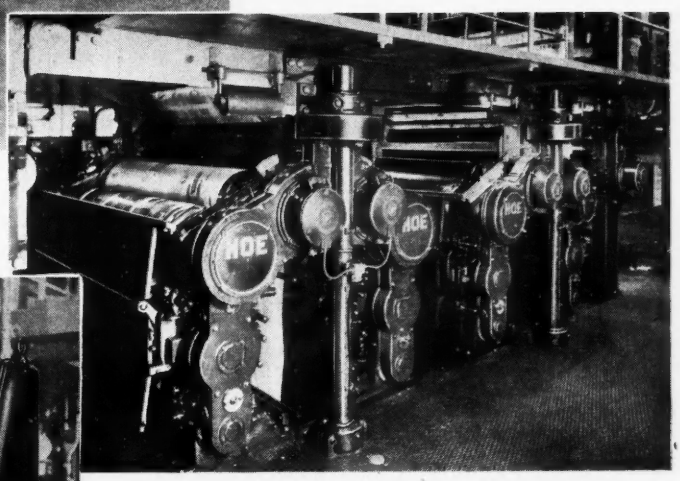


A folder control pedestal

ft. per min. The operation of these is entirely automatic through two push-buttons—"lower" and "splice." The replacement reel is automatically run up until its peripheral speed is exactly equal to that of the running web. This speed is obtained automatically, the reel diameter being calipered by the autopaster gear and the speed being set accordingly through a positive variable-speed gear box combined with an electro-magnetic clutch. The autopaster brush arm, which has been lowered into its operating position during the speeding-up of the replacement reel, comes into operation and the dabber brushes deflect the web on to the replacement reel which has been previously pasted. After a further revolution of the replacement reel the slitter knives cut the old web and the new reel is automatically rotated into its running position. The autopasters generally give an increase in output of between 20 and 40 per cent., according to the size of the press, and reduce the "white waste" at reel joins from about 75 to five copies.

On each unit two semi-control boxes are provided with "inch," "stop" and "lock" push-buttons with red and green signal lights. Similar boxes are also fitted on the reel stands. These enable the press operators to plate-up, make-ready and thread sheets through the presses. The whole of the speed control for printing purposes is carried out at the folder pedestal.

Considered diagrammatically, the press switchboard is a replica of the press itself, and it is so arranged that all the controllers can be coupled up in the same formation as the press components. The switchboard is of the unit type, that is, it comprises a separate switch panel for each unit and each folder motor equipment, and it incorporates also a main



Electro-magnetic brakes on printing cylinders

incoming circuit-breaker for each of the press groups.

Contactors and circuit-breakers are provided for each main and auxiliary motor, together with all the necessary control relays for remote operation through push-buttons mounted on the press. Selector switchgear is provided on each unit panel for the selection and isolation of main and auxiliary motor circuits, push-buttons, reel stands, autopasters and brake controls. Selector switches isolate the various components. The complete driving system for the press was supplied by Witton-James, Ltd., and we are indebted to Mr. H. Taylor, technical manager of that company, for his help in compiling the above notes. The motors were supplied by the General Electric Co., Ltd.

Metal Cable Tapes

THE use of earthed metal tapes or shields over the insulation of high-voltage cables serves to equalise electrical stresses and to carry off any surface discharge directly to the ground. The form of tape varies, but in general about 0.005in. in thickness and about one inch in width suffice, applied to the cable helically. Tinned or plain copper has been used extensively, but corrosive action has, on occasion, resulted in the destruction of the tape.

The Okonite Co., Passaic, N.J., has adopted K. Monel shield tape to defeat corrosive attacks. While admitting that the cost of this alloy is higher than that of tinned copper, its use may be economical, since it does not require coverings of expensive moisture-resistant materials. Other features of value appear to be that it is non-magnetic, has good mechanical properties and can be used in thicknesses of 0.005in. or less. The Okonite Co. has therefore adopted K. Monel shields as standard for rubber-insulated and fibrous-covered cables designed to operate at up to 35 kV under wet conditions.

THE GRID IN 1939

Central Board's Report

DURING the first eight months of last year the output of public supply generating stations once more increased at a greater rate than it did in the previous year. As a result of the change-over of industry to war conditions, however, the output for the last four months showed no advance on that for the corresponding period in 1938. As to the future, the view expressed in the twelfth annual report of the Central Electricity Board for 1939, published on Wednesday (Whitehead, Morris, Ltd., 1s.), is that the increase in the aggregate maximum demand during the war, and possibly for some years after, is likely to be insufficient to reduce the margin of spare plant to peacetime proportions if the prearranged programme for extensions were carried out in its entirety. The construction of much of the plant ordered for service in 1942 has therefore been suspended.

Sir Archibald Page, Chairman of the Central Electricity Board

As insurance against possible damage due to enemy action, consideration was given last September to the retention in this country of generating units built for Empire undertakings. However, as much of the plant was technically unsuitable for use in connection with the grid system, and also as it was desired to avoid interference with export trade, only one set was held back.

One new station went into service, and Whitebirk Station (Blackburn) was an addition to the selected list, but as Nechells (Birmingham) and Smethwick ceased to be selected stations the number remained at 137 (compared with about 500 before the establishment of the grid), of which all but one were operated under the directions of the Board. The total installed capacity was 8,658,000 kW.

With additions and reinforcements of the grid needed for normal expansion and for supplies to armament works, the route mileage of transmission lines was brought up to 4,430 (of which the 132-kV system accounted for 3,039 miles), and the number of switching and transforming stations was increased to 307, with an aggregate capacity of 10,971,000 kVA. The voltage at which several undertakings were connected to the grid was increased.

Research and Testing

Researches were carried out in collaboration with E.R.A. to determine the characteristics of lightning and the best means of reducing the stresses due to it on transformers and reactors, and also to ascertain the rate of rise of restriking voltage on the grid system. A new type of 33-kV lightning arrestor has been developed. A number of 132-kV circuit breakers were modernised, and an installation of 132-kV high-speed low-oil-content circuit breakers was put into service. Further arc-suppression (Petersen) coils were connected to lower-voltage sections of the grid.

Field testing of primary overhead-line and substation insulators disclosed that the number of faulty units was small. The anti-dirt insulators applied to certain grid substations in 1938 have been entirely free from flash-over. Straight-through joints of the compression type and clamps of either the compression or snail type are being adopted for all new grid lines or as replacements on existing lines. No changes in the selective protection were made last year; the gear had to operate on many more occasions than in previous years, and the proportion of faults correctly cleared was 91 per cent.—the highest yet recorded.

Oil-filled cables for 66-kV are now normally three-core instead of single-core as initially used. As a result of the satisfactory operation of the internal-nitrogen-filled cable laid in 1937, two additional sections are to be put into service. A new form of 66-kV external-nitrogen-pressure cable has also been ordered.

As a result of investigations carried out by the E.R.A. at the instance of the Board, power transformers ordered during the year have incorporated means to increase the resistance of windings to the electrical stresses resulting from lightning and the mechanical stresses due to external short-circuits. Limits to the intensity of noise emitted from transformers can now be specified in advance.

In addition to directing the operation of 136 selected stations, the C.E.B. controlled by agreement thirty non-selected stations; these 166 stations produced over 37 per cent. of the output, excluding that in North Scotland. A the end of the year, 218 of the 561 distributing undertakings were supplied directly from the grid, and 303 through other systems. Most of the remainder were small undertakings remote from the grid and served by local stations (some hydro-electric) or from non-statutory sources. During the first eight months of the year 50 per cent. of the energy generated for the Board was supplied by fourteen stations.

A major contribution to the Board's net revenue arises from a reduction in the proportion of spare generating plant required for an interconnected system, as compared with independent working. As a result of the lower rate of increase of maximum demand expected during, and for some time after, the termination of the war, additional charges for new plant will have to be met without the corresponding increase in revenue allowed for when the plant was ordered three to four years previously. It is suggested that the Board's tariffs, like those of other undertakings faced with increased overhead charges and shrinking sales, may have to be raised, but it is hoped to avoid doing so this year.

Emergency Pool

The greater part of the pool of switchgear, transformers, etc. (much of which was ordered in 1938), to replace temporarily apparatus damaged by enemy action has been completed. The cost of this plant is borne equally by the Treasury and by a levy upon the electricity supply industry under the provisions of the Electricity (Civil Defence) Fund. The maximum amount which may be borrowed for the purpose is £1,500,000. This fund is distinct from the "Electricity Fund" formed under the Acts of 1926 and 1928 in connection with the grid and the standardisation of frequency.

For the Electricity Fund the Board is empowered to borrow £60 millions. The amount borrowed stands at £50.6 millions and includes £15.9 millions for frequency standardisation. No application has been made by the Board to the Treasury for a guarantee (allowed for under the Act of 1926) in respect of the payment of interest and principal of the loans. Capital expenditure in 1939 was increased by £1,450,000 and stands at £41 millions for general purposes and £17.1 millions for standardisation of frequency.

Revenue for general purposes, which is derived from sale of energy, amounted to £37.9 millions, or £3,134,000 more than costs of energy purchased, management expenses, etc. This balance represents an increase of £380,000 over that for 1938, which was £740,000 in excess of the figure for the previous year. The fall in war-period maximum demand is chiefly responsible for the smaller rate of increase of the balance. Adding to this sum previous balances and other contributions, the amount for general purposes available for distribution comes to £5,500,000, of which £1,580,000 was appropriated for interest on stock, £1,150,000 for redemption, and £330,000 for taxation, leaving a credit balance of £2,440,000. Total redemption fund contributions for the year amounted to £1,418,000, bringing the amount now provided for redemption to £4,764,000. The balance of revenue carried forward is £2,434,000, which will be available for meeting interest and redemption charges in the future.

Appendices give a summary of accounts, an outline of trading conditions, form of grid tariff, and comparisons of grid tariffs in the eight regional areas under the Board's operations. Particulars of new plant and certain information regarding operation are omitted from the report owing to war considerations. The election of Lord Barnby as a member of the Board in place of Sir Andrew Duncan is recorded.

War and the Workers' Health

AN emergency report of the Industrial Health Research Board entitled "Industrial Health in War" has been issued by the Medical Research Council (price 6d.). By the adoption of the measures recommended in this report it is claimed that the efficiency, health and comfort of workers in factories can be improved, production increased and discontent and fatigue avoided. The report is based on the results of many years' research, the subjects dealt with include: Output and fatigue in relation to excessive hours with insufficient intervals for rest; effects of inadequate or unsatisfactory lighting, heating and ventilation; causes and prevention of accidents; and recording sickness absence and accidents as a guide to loss of efficiency and well-being.

SALES MANAGERS' PROBLEMS

Discussions at the E.D.A. Conference

WELCOMING the 200 delegates at last week's E.D.A. Electricity Supply Sales Management Conference, Mr. A. C. Cramb, the director of the Association, declared that the representative attendance proved that there was as much, if not more, justification for holding the conference now, as there was in peacetime.

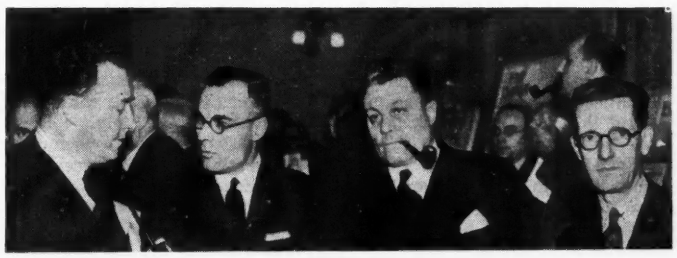
The electricity supply system of the country was one of the finest assets of the nation, and not only enabled munition factories to be situated in any part of the country, but also economised in labour for the manufacturer competing in export markets, the farmer who had to cultivate more land, and the housewife who generally had more work to do with less help. Two applications of electricity in particular should be encouraged in wartime in the national interest and because they would bring valuable additional revenue during and after the war. These were the electric battery vehicle and the increased use of electricity in agriculture.

Mr. J. C. Dalton, manager and secretary of the County of London Electric Supply Co., Ltd., with E.D.A. officials, Messrs. A. C. Cramb, V. W. Dale, and J. I. Bernard

Last year there were about 5,000 electric vehicles on the road and since the war began probably 1,000 additional vehicles had been put into service. Demand had been greatly stimulated by the activities of E.D.A. and the Electric Vehicle Association. The E.D.A. Rural and Agricultural Electrification Committee had had several meetings to consider the special part electricity could play by saving labour and imported oil in the increased production of food.

The Electric Cooking Committee had issued last November a strong recommendation that hire and hire-purchase facilities should be continued and at present there were few undertakings which did not offer these facilities. Returns of cookers, water heaters and other appliances connected all showed increases even in the worst quarter, which ended December 31st last. The Association was in close touch with the national movement to conserve the country's food supplies.

Opening the discussion on Mr. J. C. Dalton's paper on "Sales Management Policy in Wartime" which was summarised in our last week's issue, Mr. Allan East (Electricity Commission), said he did not approve the resurrection of the Electricity Commissioners' Committee on tariffs, but suggested that the recently appointed Joint Committee of the Electrical Industry was best able to deal with matters of this kind. It did not matter what the tariff was, or what it was based on, so long as everyone used it. He would like one tariff made compulsory in every area, leaving undertakings free to introduce other tariffs if they wished. He was interested in the admission that the sale of current was subsidising part of the cost of apparatus let out on hire or hire-purchase. The price, indeed, was in many cases wholly uneconomic.



Messrs. A. H. Young (Edmundsons), G. E. Barrett and H. G. F. Gamble (Northmet) and S. I. Ellis (Nesco)

Mr. R. Birt (Ealing) hoped that the powers that be would not delay in obtaining acknowledgement of the necessity for increasing electricity charges. Regarding the closing of showrooms and discontinuance of demonstrations at the beginning of the war, he thought most authorities were influenced by the Government pronouncement relating to the assembly of persons.

Mr. W. J. Bache (Cheltenham) considered that the present situation offered a wonderful opportunity to get rid of unremunerative tariffs and suggested that on any Committee set up to consider tariffs the Electricity Commissioners and consumers ought to be represented. In the framing of any future Fuel and Lighting Order, provision should be made for space heating as well as cooking and water heating, since in an all-electric house this represented about 40 per cent. of the total consumption. Mr. W. J. Johnston (St. Helens), thought that the decisions made regarding showrooms and demonstrations showed over-caution rather than panic, and that the Treasury letter had been taken rather too much on its face value; if a public need could be shown, no difficulties were raised by the Electricity Commissioners. With regard to the "truce" did not the "disparaging statements" referred to all come from the other side? If, however, out of the truce electricity emerged as the "No. 1 industry" some good might have come from it.

Mr. S. I. Ellis (N.E.S. Co.) said that perhaps not the least of their duties at present was to keep the goodwill of consumers and assist them in the use of their equipment and not try to induce them to buy appliances that could be regarded as luxuries. They should interfere as little as possible with tariffs; he favoured percentage increases as showing electricity in the best light as compared with increases in prices of other commodities. Mr. W. K. Fleming (Scarborough) agreed that prices should not be increased until absolutely necessary, since the general public had short memories for decreases but long ones for increases. E.D.A. might do some advertising on the question of price increases, taking consumers into its confidence and giving reasons, incidentally pointing out that even before the war costs had been steadily rising. Prices should not necessarily be reduced again as soon as possible since some of them were already too low and surplus funds might be better employed for strengthening the distribution system. The resurrection of the Tariff Committee was no use unless the Commissioners were prepared to make a statutory multi-part tariff compulsory. He asked for full support of E.D.A. during wartime.

Despite the large extra amount of work brought about by the war, said Mr. G. E. Barrett (Northmet), undertakings should endeavour to give normal service. There was nothing to fear from the "truce" provided both sides honoured it. Mr. R. H. Rawll (Birmingham) stated that the position showed that some undertakings were selling electricity too cheaply. The primary problem was not so much the adjustment of tariffs, but the consideration of the cost of giving different classes of load. Mr. A. H. Young (Edmundson's) contended that unless manufacturers obtained materials for the home market they would not be able to look after the export side. He thought more use should be made of employees other than sales staff for developing sales. Mr. W. H. Ellerker (West Hartlepool) said that hire-purchase must be considered seriously as an alternative to hire, while Mr. W. N. Smithson (Darlington) believed that the amount of business they were able to get was likely to depend on the quantity of apparatus available.

Mr. J. J. Lesser (City of London Co.) declared that they had to justify what they were doing by considering whether it was in the national interest. They could, for example, justify the further use of electricity by the reduction in the number of petrol driven coal vans on the road and by the dearth of domestic help now available. Mr. Cramb thought that uniformity of tariffs could be overdone and that although there were far too many, the trying-out of various tariffs had helped the industry along. The war was a godsend to undertakings which had been unwise in reducing tariffs too much.

Replying to the various points raised, Mr. Dalton said that he did not think that the National Joint Committee was the best body to consider the question of tariffs. With regard to the "truce," it had been agreed that "new business" included changes of tenancy. He questioned whether the turning out of a gas appliance and substituting an electrical one could really be justified in the present situation. The "truce" meant that undertakings could go out for all they could get, but must have regard to the national interest. The last word in deciding whether she should have an electric or gas cooker rested with the housewife.

Importance of Sales Staff

Introducing his paper on "Sales Managers' Problems," Mr. J. B. Ashworth (consumers' engineer, Blackburn Electricity Department), said that in the past few years the electrical industry had controlled its own business and development and the main result of the war had been the disruption of this system. The falling-off of sales when the war started indicated how dependent the industry was on its sales staff. Sales staff should not now be put on to "house cleaning jobs" but should investigate new outlets for development brought about by the war.

Mr. L. G. Price (St. Helens) said that they now had to get new business with a good deal of discretion. The war gave them a chance to ascertain which of their schemes were economic. The "non-aggression pact" with the gas industry had got to be watched very cannily. Many movements were afoot for joint control. This made a good story for the town council, but the electrical industry would not stand for it in peacetime. The pact should be restricted to "honest-to-goodness business." Advertising should be used mainly towards exploiting capital already put into the undertaking and a lot could be done with co-operative advertising.

Mr. H. G. F. Gamble (Northmet) said that he had noticed the increased income of households, his undertaking having connected a record number of refrigerators since the war began. Mr. H. Lamerton (Midland Electric Corporation) said that salesmen should be salaried and not commissioned, otherwise they were going to get sales of low consumption apparatus but not much load. He found that domestic science teachers resented efforts to assist in teaching schoolchildren. They must use the opportunity afforded by the National Food Campaign; in activities of this kind, the Electrical Association for Women was most valuable.

Mr. G. A. Adams (Burton-on-Trent) said that each undertaking must frame its own policy and must retain consumers' goodwill. Showrooms windows and interiors should be kept at least as attractive as before the war. Mr. F. Lynn (Brighton) said that in the south the wage earner had not got more money and the load lost in street lighting, shop windows and domestic supplies had not been counterbalanced by much increased industrial load. Definite moratoria had to be made in the case of hire-purchase agreements entered into by consumers with much reduced earnings or entering military service. Facilities for providing apparatus must, however, be available, and this made them look more kindly upon hire.

On the same subject, Mr. C. P. Southwood (Liverpool) declared that people would want what they could have, and that his undertaking was now disposing of 130 cookers a month on hire-purchase as compared with 120 a month on simple hire before the war. Hire-purchased apparatus was going to meet the demand for the house-proud housewife, who would take more care of it and thus reduce maintenance. Despite the discontinuance of hire-purchase of radiators at Liverpool sales had not dropped. He deplored unjustifiable increases in prices of apparatus and also the reduction of the refrigerator guarantee.

The need for some general arrangement for the transference of hire-purchase agreements from one undertaking to another was emphasised by Mr. Hedley Davis (Islington). Mr. W. G. Nottage (Beckenham) declared that the result of changing over from hire to hire-purchase had been that consumers could be induced to purchase better-class and more expensive apparatus. Mr. W. B. Leigh (Croydon) mentioned that in his area there had been no fewer than 26,000 changes of address and 5,000 disconnections. They had dealt with the situation by making arrangements for transferring agreements (by putting forward new agreements), for cancelling agreements, and for suspending them until evacuated consumers returned. Mr. Cramb felt that hire-purchase should be carefully considered, for the apparatus received more attention by the user who was not so likely to change it.

At the conclusion of the discussion delegates had an opportunity of seeing the new E.D.A. films, "The Village that Found Itself," "Hot Evidence," and four other shorter ones.

Before the discussion of his paper on "Consumers' Complaints" on Thursday morning, Mr. G. E. Barrett (commercial manager, Northmet) emphasised the advantages of personal contact for dealing with complaints, and said that as a result of the system introduced by his company it had been possible to improve service in several directions.

A scheme mentioned by Mr. E. Brown (Hackney) should be useful for the smaller undertaking where all the inflow of complaints was at one point. Copies of complaints were typed immediately upon reception and distributed simultaneously to everyone likely to be concerned. Besides saving a considerable amount of time in tracing the person responsible, this arrangement enabled all kinds of analyses to be made. Mr. M. C. Lawrence (Central Sussex) agreed with Mr. Barrett regarding the difficulty and cost of getting foreign or non-reputable apparatus repaired.

Mr. R. D. Spurr (Sunderland) thought that the cost of accounting as set out by Mr. Barrett was more than it was worth and that accounting should not be allowed to go mad. Complaints in his area were promptly dealt with, in many cases by service men telephoning the central office when they passed substations. Mr. Morgan (Barnes) advocated the appointment of a complaints officer and also the decentralisation of accounting, while Mr. G. D. Proctor (Manchester) advised the setting aside of a special room for dealing with complaints received at showrooms. Mr. A. C. Green (Norwich) thought that there would be a waste of time reading the broadcast complaints suggested by Mr. Brown. One could treat complaints too seriously. Mr. Hedley Davis thought that a complete record should be kept not only of complaints but also of indications of satisfaction, thus imbuing operatives with a spirit of service. Mr. S. I. Ellis thought that the paper shortage would prevent his undertaking setting up a system such as Mr. Barrett suggested, and in any case complaints were dealt with promptly.

Messrs. R. D. Spurr (Sunderland), H. T. Timberlake (Brentwood) and R. Mellor (Carlisle)

National Food Campaign

In preparation for the afternoon session, Mr. J. I. Bernard (chief technical adviser, E.D.A.) explained the electrical industry's part in the National Food Campaign. The object, he said, was to encourage economy of food, the home production of food, the use of food of which there was a surplus, and the nutrition of the poorer section of the community. Advice and demonstrations were essential, and the Ministry of Food had called on the Ministry of Education to help. The educational authorities had not facilities, and accordingly it was necessary to call in electricity and gas support. The Ministry of Health was spending a large amount on the campaign, and the electrical industry should "cash in" on it. A general invitation was being issued in the Press for the public to visit showrooms immediately, and accordingly it was essential that showrooms immediately. Electricity undertakings should inform local food offices when demonstrations were being held.

Addressing the conference in the afternoon, Lord Woolton, the Minister of Food, said that his department had three things to do: first, to secure that the food should be available; secondly, that it should be properly used; and thirdly, that if things went badly in the future the public should be sufficiently adaptable as a result of the preliminary training they had had to continue to feed their men-folk and children in those difficult times. The food supplies were here now, but it did not follow that we did not need to be careful. The second part of the job was outside normal business work, and went right into the homes of the people and involved mobilising in a great national effort all the people who were cooking in this country. He was asking the electrical industry to assist in this work.

Giving further details of the campaign, Mr. R. W. Harris (assistant secretary, Ministry of Food) said that besides providing an opportunity to help the Government, it gave the electrical industry a chance to help itself. He drew attention to two leaflets, the first of a series, which would be available for distribution at demonstrations, dealing respectively with "How to Eat Wisely in Wartime" and "Wise Housekeeping in Wartime."

The demonstration van of the Northmet Company was in evidence at the inauguration ceremony.

ELECTRICAL MANUFACTURING in 1939

Annual Report of B.E.A.M.A.

THE annual meeting of the British Electrical and Allied Manufacturers' Association was to be held yesterday (Thursday). The report covering 1939, which was presented, stated that during the year, even more than in 1938, trading conditions were disturbed by the political situation. Efforts towards economic collaboration were ended abruptly by the German invasion of Czechoslovakia in March. The necessary changes brought about by the outbreak of war naturally resulted in dislocations, but towards the end of the year the industry began to settle down to the new conditions.

There was an increase in employment during the first part of the year and at the outbreak of war the total effective labour force in the industry was over 340,000. In spite of rearmament demand, export business was only a little below the record 1938 level during the first eight months of the year. Exports of both machinery and goods and apparatus were well above the 1937 figures. In the case of generators, exports were actually 20 per cent. greater up to the end of August than in the corresponding period of 1938, and 85 per cent. higher than for 1937. The report made reference to the effect of Government control and of restrictions upon the consumption of electricity. It stated, however, that the demand for electrical plant for industrial undertakings was very high and might well become even greater, as was the case during the last war. This might stimulate the demand for generating plant.

The problem of the limitation of expenditure by the public was another factor affecting the industry. Since much of the industry's trade was the result of the replacement of older, less efficient apparatus, the problem was often to balance present capital costs against future economies. In wartime this involved more than purely financial calculations; capital outlay might require materials which were in short supply, whereas the future economies might save only materials of which there was an abundance. Saving in man power and transport must rank very high and in this respect electrical equipment was of great importance. The restriction of the borrowing powers of supply authorities and the suspension of railway electrification schemes had affected the industry.

Export and the Home Market

Export trade had assumed a special prominence, but there was a tendency to overlook the fact that exports depended upon an active home market. If there was a reasonable prospect of securing export business it would be necessary to continue to supply home requirements in order to maintain production for the export market. The Government had urged the necessity for export trade and promised its support of exporters, but the business obtained must depend upon conditions of demand. The factors favouring British exporters were the elimination of German competition outside Europe, and the increased purchasing power of the primary producing countries. There might be increased competition from local industry and from neutral countries; the former need not, however, be detrimental to exporters, but there was a need for an endeavour to ensure that Empire industries should be complementary and not competitive. With regard to the competition of neutrals, there had not yet been great differences between the prices of materials here and abroad. There were shipping problems and other difficulties, which might tend to raise British export prices, but neutrals, too, suffered from many of our hardships, and the depreciation of sterling had offset some of their advantages. In the Empire, neutral competition might be lessened owing to the need to conserve supplies of foreign exchange, and in many other markets substantial British purchases might be used as an argument for securing that imports were obtained from Great Britain.

Despite the early dislocation caused by the war, the Association's Economic and Statistical Section was immediately ready to take up with the Government the problems of electrical export development. The Section was reorganised and special efforts were made to obtain all available statistics on electrical export trade throughout the world, particular studies being made of the trade of the Dominions and of Germany's electrical exports. The Section had also been active on work connected with the trade discussions between the British Government and Dominion and foreign Governments.

The "B.E.A.M.A. Journal" had been developed so as to give greater prominence to the Association's export activities, and the "News Sheet" had been of special value in acquainting members with wartime regulations. Further revised sections of the "Brown Book" were issued by the Contracts Conditions Committee during the year but war problems had prevented the revision and issue of the few remaining sections.

The Taxation Committee submitted through the F.B.I. comments and suggestions for amendment of the Finance Bill (No. 3). In the matter of the investigation of prices for Government contracts the Association had put forward the view that the manufacturer must be regarded as a complete unit and that in arriving at true costs the total normal on-cost must be admitted as a proper charge.

In a reference to the work of the Standardisation Committee the matters touched upon included terminal markings, relays, instruments, meters, ceiling fans, motor control gear, fuses, motors and generators, transformers, mercury-arc rectifier equipment, oil-immersed switches and circuit-breakers, mining and flame-proof enclosures and accessories. Meetings of special technical committees had been held to deal with special items such as cooker control units, cable couplers, cable boxes and bell transformers.

Several meetings of the I.M.E.A.—B.E.A.M.A. Joint Committee were held at which a number of common problems were discussed. The number of overseas students employed in members' works during 1939 was 256, as compared with 262 in 1938. As before, the largest number were from India (72), followed by Africa (36), China (26), Australia (23), Canada (21), Germany (18) and New Zealand (15).

The report referred briefly to the work of the Association of Short-circuit Testing Authorities (A.S.T.A.), the Electric Light Fittings Association, the Electrical Research Association, the Electrical Development Association and the Electrical Fair Trading Council. It was stated that the last body was examining the possibility of listing for the industry's benefit and guidance the firms and organisations who from time to time endeavoured to obtain discounts to which they were not entitled. During the past year twelve new members had joined the Association.

Wartime Activities

Appended to the report was a special supplement dealing with wartime developments. This made mention of the two Export Committees which had been set up by the Association to deal with electrical machinery and electrical goods and apparatus. Although the Export Control Order, which prohibited, except under licence, the export of generators, switchgear and transformers, had caused some dislocation, by the end of the year the control was working smoothly and efficiently. As a result of discussions between the Director (Mr. V. Watlington) and the President of the Board of Trade and members of the Export Council, it was hoped that by the time the report was in the hands of members arrangements would have been completed for a "global" allocation of materials for electrical machinery exporters. Mention was made of the arrangements with regard to the French import quota system.

There were rises in imports during the early part of 1939, but the first Import Control Order banned certain classes of electrical goods and subjected other classes to licence. The control was further extended in October to cover practically the whole range of electrical goods, apparatus and machinery. In view of the vital need for conserving the demand for foreign currencies, the Council had welcomed this curtailment of imports of goods which British electrical manufacturers were competent and ready to supply. On all questions affecting import licences, the Association was consulted by the Board of Trade, and in many instances it had been instrumental in finding home manufacturers capable of producing equipment which normally would have been imported.

In a reference to the War Risks Insurance Act, 1939, it was stated that the Board of Trade was being pressed to amend the Act to bring within its scope goods or materials appropriated to a contract which included erection. The Council had drawn up a special clause covering price variations for insertion in members' contracts. This had been approved by the I.M.E.A. pending the issue of a variation clause by the I.E.E.

A great deal of special work had been undertaken by members engaged in the production of heavier equipment. Other members producing lighter classes had found their output considerably reduced. A directory had theerfore been prepared showing the surplus manufacturing facilities of such firms in need of work and copies had been sent to various Government Departments.

Major V. Z. de Ferranti, the chairman of the Association, has been on service since the outbreak of war and was now overseas. Mr. J. L. Wilson, the vice-chairman, had acted as chairman since October last.

INSTITUTION PROCEEDINGS

Scope for H.R.C. Cartridge Fuses. Factory Electrification Practice

Cartridge Fuses

THE short-circuit performance of filled-cartridge fuses of the high-rupturing-capacity type, as described in the paper by Mr. J. W. Gibson to which reference was made in our last issue, was debated at the Institution of Electrical Engineers in London on April 11th.

Professor E. W. Marchant opened the discussion by explaining how tests which he had made years ago for the Liverpool Corporation had shown that severe short circuits would blow the fuses first, and those not so severe would cause circuit-breakers to trip before the fuses blew. Those experiments showed that copper was a more satisfactory fuse element than tin, which was the reason why copper was used on the Liverpool supply system. When condensers for power factor correction were left charged there might be enough energy stored in them (three times the peak voltage of the AC supply system) to blow their fuses.

Mr. J. W. Leach (London Associated Electricity Undertakings, Ltd.) said that one of the greatest difficulties was discrimination, not only between successive fuses of any one make but between different makes when used in a similar way, which led to the conclusion that it would be a very good thing if consumers were encouraged and educated to use the enclosed cartridge type of fuse with similar characteristics to the fuse which the supply authority used. That being so, the consumer was entitled to ask for ability to rupture without "fireworks" outside the cartridge and without cracking of the cartridge itself. These fuses should be cheaper than they were at present so as to encourage consumers to purchase them in larger quantities and keep small numbers in hand for renewals. The standard size must be available for sale "over the counter" of any shop and to fit standard terminals. More co-operative research was necessary among manufacturers before a satisfactory position could be reached which would ensure a wider application of this type of fuse.

Overlapping the Oil Circuit Breaker

Dr. W. Wilson (General Electric Co., Ltd.) said that the fuse was already overlapping the functions of the oil circuit-breaker and could be regarded as a precision device. It could be designed to break a given current or power and it could be relied on to do so and to operate within a given time. Thus it was possible to secure discrimination in every kind of protective device. In his view, the fuse had out-stripped the circuit-breaker, at least in some respects, and the information in the paper concerning the high-speed fuse indicated that a protective instrument was now available which would be very useful indeed and save a great deal of expense. It did not have to wait for a zero pause before the circuit was broken, which fact had given rise to the prospective current method of rating apparatus which would give a new power to switchgear engineers.

Dr. L. G. Brazier (Callender's Cable & Construction Co., Ltd.) remarked that a particularly pertinent question was how to determine on site the actual value of the short-circuit current, apart from the rather dangerous method of applying a dead short circuit. A few years ago his company was able to calculate the short-circuits which might be expected at various points in a typical London network and it was found that at a not inconsiderable number of places a short-circuit in the consumer's service box might be expected to rise to about 29,000 A. Therefore it was not surprising that the development of the cartridge fuse had been extraordinarily rapid and it had been helped by B.S.S. 88, which when revised again should include directions concerning discrimination and the phase position at which the test short-circuit was applied.

Mr. A. M. Pooley suggested that a fuse might be in circuit for years before being called upon to operate; during that period it might have had to carry overloads, so suffering deterioration, and fail eventually at less than its correct current value. The form of construction in which a silver element was used with a blob of solder might suffer from such deterioration especially if ordinary tinman's solder were used.

Mr. A. W. Metcalf (Callender's Cable & Construction Co., Ltd.) said that a cartridge fuse might be called upon to discriminate in two distinct ways and that in cartridge fuses of the small dimensions now common when operating near their short-circuit currents, a temperature of 800 deg. C. would probably be reached on a steady overload if pure high-conductivity elements were used.

Dr. C. C. Garrard (General Electric Co., Ltd.) emphasised the statement in the paper that 25,000 kVA should be the limit for the short-circuit current in a well-designed distribution network. The most remarkable feature of the high-rupturing-capacity fuse was its capacity to rupture large currents suddenly without any voltage rise. The paper constituted a remarkable advance in the theory of the subject although he was inclined to say that it could hardly have been written without the very notable advance which had occurred in recent years in circuit-breaker theory. Until the advent of B.S.S. 88 there was no criterion of performance for fuses and he was grieved that the author had thrown some doubt on the validity of that. If B.S.S. 88 were limited to quick-acting fuses the situation would be cleared up as regarded the validity of the categories given in that specification. Unfortunately, the paper in one part rather gave the impression that the terms "quick-acting" and "high rupturing capacity" were synonymous, although in another part the author stated that the quick-acting characteristics depended on the circuit. His own view was that the fuses should be quick-acting; the quicker the better, and therefore it might be a good thing to limit B.S.S. 88 to quick-acting fuses.

Voltage Surge Possibility

Dr. E. Billig (Hackbridge Electric Construction Co., Ltd.) said the main advantages of the cartridges fuse were the higher rupturing capacity and the very quick action, but there were some disadvantages also, the main one being the voltage surge which would be introduced into the circuit if the fuse were not very carefully designed. That point had not been sufficiently emphasised by the author. The arc drop should be sufficiently above the crest voltage of the system, but the voltage must not be too high otherwise surges would be created which would be dangerous elsewhere in the system.

Mr. P. V. Hunter said that one feature he had always regarded as important, which was not dealt with in the paper, was the relation between the maximum continuous current-carrying capacity of the fuse and the minimum fusing current. In the design of high-rupturing-capacity fuses there was rather a tendency for this relation to vary widely. For instance, if a purchaser bought a 30-A fuse for controlling a 30-A circuit, he did not want to find that, although it had many admirable characteristics, it ignored all currrents up to 90 A.

Mr. R. W. Strafford (Belling & Lee) said that as the ability of the fuse depended largely on the constants of the circuit, there should be some physical relationship between the properties of the fuse and the circuit. Therefore, he could not see how one fuse for a particular current and particular rating could fully satisfy the general requirements met with in service.

The author, replying, said that although there were many variations at present, certain types had become standardised by commercial usage. Shielding prevented a temperature of 800 deg. C. being applied to any soldered joints liable to deteriorate. Most designers agreed that B.S.S. 88 was not perfect; it would be very difficult to confine it to quick-acting fuses. He agreed that it was necessary not to have too high a fusing factor. A large number of factors influenced the performance of the fuse, and manufacturers did not content themselves with testing merely to specification.

Electricity in Large Factories

FACTORY electrification was the subject discussed by Mr. G. H. Buckle (consulting engineer) at a meeting of the Association of Supervising Electrical Engineers in London on April 16th.

The author confined himself to factories of from 200,000 to two million sq. ft. floor area of the single-storey, span-roof type which was perhaps best known in connection with the manufacture of engineering products on a quantity basis. Such factories usually consisted of separate buildings connected together by service roads, and a high degree of lighting intensity was desired in almost every building. The general method of distribution was by means of high-voltage cables with unit substations containing transforming and control apparatus situated as near as possible to the maximum load points. For a maximum demand of about 6,000 kVA 6.6 kV had been most convenient, while for 12,000 or 15,000 kVA 11 kV had been used on the ground of economy. Two ring mains interconnected were very adaptable and particularly advantageous when two sources of supply were available. With two-thirds of the demand available from either substation, very little inconvenience would be caused by the failure of one.

Paper-insulated, lead-covered, wire-armoured cables connecting the substations were mostly run in the verges surrounding the factory buildings, in earthenware ducts laid to a slight fall and the interconnecting manholes drained, as it was practically an impossibility to prevent water entering at some point or other on a large site. Protection for the high-voltage cabling system on the "Solkor," B.T.H. self-compensating pilot wire or the "Translay" systems was successful. Overcurrent and earth-leakage protection was desirable on the switchgear to look after busbar faults.

Substation transformers should for the most part be kept down to about 500 kVA, although in hardening or heat treatment shops 1,000 kVA transformers had been used. The substations should be limited generally to about 2,000 kVA, delta connected on the high-voltage side and star connected on the low-voltage side with earthed neutral, the neutral wire being brought out to provide 230 V for lighting. Intertripping was provided between the circuit-breakers on the high- and the low-voltage sides of the transformers. The feeder breakers were kept the same size so far as possible for interchangeability. A typical substation would have 14 in. walls, 6 in. roof slab and pits for draining oil from the transformers, which were in separate brick cubicles to localise the effects of fire or explosion, with doors opening on to a road, protected by an internal or external blast wall. It was not thought advisable to install outdoor transformers under present conditions owing to risk of explosion or splinter damage, although they could undoubtedly be used with suitable armourplate or blast wall protection.

Distribution Services

Low-voltage distribution cables were generally of the paper-insulated drained type with lead covering and bright wire armoured, but those run underground to adjacent buildings need not necessarily be drained. Generally, wherever there were continuous rows of machine tools the overhead busbar system was used for flexibility, while for isolated machines or small groups, ordinary fuseboards and permanent connections were used; 40 per cent. diversity had been encountered only once, the average being nearer 30 per cent. From the individual fuse units on the overhead busbar v.i.r. cables in conduit or in flexible metallic tubing ran to the machine tools; for those which had more than one motor, distribution boards were mounted on the tools themselves with provision for low-voltage combined transformer-plug units for small local lights. The busbar system was also used as a means of distributing energy to unit heater motors and other similar small power apparatus, from a fuseboard conveniently positioned to serve a group, thermostats being interposed to cause the motors to cut in or out according to temperature variations, with short-circuiting switches so that the fans could be used for cooling in the summer.

For proper protection and discrimination the fuses were carefully graded right from the main splitter boards to the machine tool motors and the use of the high-rupturing-capacity cartridge type fuses was favoured throughout the installation.

Supply to Heat Treatment Furnaces

Furnaces for heat treatment generally had caused quite a distribution problem. Their makers used from 100 V upwards and made a practice of supplying their own transforming apparatus. Therefore a substation was placed as close to the heat-treatment room as possible, from which cables were run at 400 V to distribution boards consisting either of circuit breakers or high-rupturing-capacity fuses from which connections were taken to the furnace transformers.

For large DC motors sometimes used for testing it was most convenient to arrange a special substation to enable mercury arc rectifiers of the steel container type to be situated adjacent to the transformers and also within short distance of the motors which they were to feed, thus avoiding cable cost and making for higher efficiency.

Where the cost of energy was about 0.5d. per kWh and artificial light was in use for 24 hours a day, there was little to choose between uncorrected mercury and tungsten lighting, fluorescent colour corrected lighting being a little more expensive owing to the increased cost of lamps and their slightly lower efficiency. As electricity cost was more likely to be in exess of 0.5d. than below it, the discharge lamp would in most cases be the more economical.

Initial intensities of from 25 to 30 ft.-candles were very suitable, and 400-W lamps spaced to give this intensity generally suited most types of roof construction for a building 16-18 ft. high. In the case of tungsten lighting, the author's own view was that such a high intensity was not required, and that an initial 20 to 25 ft.-candles was very satisfactory.

With a fitting combining both types of lamps very good results were obtained, but the system was costly. He did not care for mixed lighting with alternate standard fittings of both types. To correct the stroboscopic effect of discharge lamps, no two adjacent lamps should be on the same phase. As they required heavy starting current it was beneficial to switch them by means of contactors operating banks of lamps, the contactors being controlled by adjacent push-buttons. An aluminium anodised reflector had been experimented with, and it would appear that the character of the reflecting surface would give a wider angle of distribution and greater efficiency than that normally obtained from a vitreous enamelled reflector.

Separate pilot lighting with 100- or 150-W lamps placed at about 80 ft. centres was very conveniently controlled by a contactor which was normally held off by the main lighting supply, failure of which caused the pilot lighting to come into operation, with overriding push-buttons at entrance and exit doors for inspection purposes. It was most convenient for all the lights in a building or large section to come on at once. thus permitting better supervision, but this was expensive, and in the smaller type of factory would not be warranted. A pilot lighting system was particularly desirable where discharge lamps were used.

The power requirements for works offices were simple, but telephone and signal systems usually presented quite a problem; rectangular metallic duct systems had frequently been accommodated in a false skirting board which served desks placed near a main wall, desks in the centre of a room being fed by similar ducting cast into the floor with suitably made outlet boxes.

The most convenient method of intercommunication was by automatic telephone and time signals, staff location, A.R.P. warnings, fire alarms and general instructions were most easily given by a microphone and loudspeaker system, signal generators now being available to give any kind of sound effect desired.

To provide lighting for the A.R.P. centre and ambulance rooms a self-contained generator set would render them independent of outside supplies, but if proper supervision were arranged a separate battery system was to be preferred.

Parliamentary News

By OUR SPECIAL REPORTER

Charges in Rural Areas

IN the House of Commons on April 10th Mr. Woodburn asked the Minister of Transport whether he was aware of the differences between the charges for electricity in urban areas and in country and other areas outside the low-rated areas; and whether, in order to eliminate the hardship and difficulty facing those using electricity under the latter conditions, and in order to encourage a greater use of the service, he would take steps to make electricity a national service, and to make the charges uniform throughout the whole of Britain.

Capt. Euan Wallace said that, owing to such factors as the lower density of population and the smaller number of consumers in relation to the capital expenditure involved, the charges for electricity in rural areas were in a number of cases higher than in adjoining urban areas. The answer to the second part of the question was in the negative.

The Notting Hill Co.

Mr. Duncan asked the Minister of Transport whether he had considered the report for which he asked regarding the increases in charges proposed by the Notting Hill Electric Lighting Co.; and what action he proposed to take.

Captain Wallace said that the Electricity Commissioners had carefully examined the detailed estimates of income and expenditure and supporting data upon which the Notting Hill Electric Lighting Co., had based its increased charges. The Commissioners had advised him that they saw no reason to take exception to the estimates, which made no provision for earning any dividend on the 6 per cent. cumulative preference shares of the company or any dividend on the ordinary shares. In all the circumstances, he did not see any grounds for intervening; he had, however, asked the Electricity Commissioners to review the position at the end of June.

Trinidad Electricity

In reply to Mr. Jagger, Mr. Malcolm MacDonald, Secretary of State for the Dominions, said that in the Trinidad Electricity Board Ordinance No. 39 of 1935, no period was specified during which the Government was required to exercise its right of purchasing the whole or part of the undertaking for the purpose of establishing an island-wide supply of electricity. Consideration of the question of establishing such a scheme under Government control was temporarily deferred on the outbreak of war, but he understood that it would be further examined at a later date.

CORRESPONDENCE

Every letter must be accompanied by the writer's name and address preferably, but not necessarily, for publication. The Editors cannot accept responsibility for correspondents' opinions

Neon Sign Contracts

MR. MOYS answers my questions squarely. His contracts are of simple hire with maintenance, and if at the end of the contract the hirer cannot agree with him on the terms of a new contract, Mr. Moys sends down his men and removes the sign. Without in any way challenging this clear statement as to his company's practice, I may be permitted to say that a large majority of the sign contracts with which I have to deal are three-party contracts with the finance company as owner and the manufacturer as mantainer. With these contracts, on termination, I have never known any finance company attempt to remove a sign; it has always been left in the undisputed possession of the user and I have never heard of a claim to proprietorship being made by the manufacturer.

From Mr. Moys's explanation it is clear that the user, if he cannot agree to the terms for a new contract at Mr. Moys's own price, must submit to having the sign removed. He is at Mr. Moys's mercy, which is unquestionably bountiful, though this may not be possibly generalised to all manufacturers. That he must have paid a sum representing the full retail price of the sign, apart from maintenance is obvious. Were it not so Mr. Moys would stand to lose on every sign if the user decided not to continue, and his commercial acumen would not allow him to run such a risk. Incidentally, I have frequently asked sign manufacturers what the repossession value of a sign was, and they usually tell me 5 per cent. of the retail price. If this be the case, it does not pay to remove the sign.

Unless a difference were made for reasons of commercial strategy and the prices were dictated by plain costing, a user would pay the same price under a hiring contract involving a high possibility of loss of the sign as under one of absolute sale under which his property in the sign would be certain. The fact that users can be induced to enter upon such precarious hiring contracts evidences once more the boundless limits of human folly and is a high testimonial to the powers of salesmanship of Mr. Moys's staff. E. P. HOLLIS.

Twickenham, *April 15th.*

Three-pin Lighting Plugs

I was interested in Mr. John Bland's examination of the plug question but cannot say that I agree with his theories. I admit that in my own domestic installation there are two-pin plugs in use in earth-free situations, but should these situations become altered I should certainly alter my installation accordingly.

To say, however, that the foregoing arrangement is good practice would be entirely incorrect as Mr. Bland or anyone else cannot be sure that any situation will remain "earth-free." I have seen situations that were originally earth-free but, eventually, plumbers came along and stuck in gas and water pipes in close proximity to electrical apparatus; also, there are the wireless amateur who runs bare earth wires and the telephone man who runs earthed lead-covered wires, etc. The correct arrangement is undoubtedly three-pin sockets and plugs with interlocked switches throughout which makes for safety and is as nearly foolproof as humanly possible.

Regarding the householder who connects two-core flex to three-pin plugs there is, unfortunately, little that can be done to prevent it, but it would be equally difficult to prevent him from taking poison if he so desired. As electrical engineers we should always recommend the correct procedure and personally I am all for three-pin plugs until we reach that Utopia when only all-insulated apparatus will be in use. So far as 2- and 3-A plugs and sockets are concerned I am in favour of their complete elimination. A. MILNE.

Glasgow, *April 7th.*

Supply Rates and Tariffs

One of the chief causes of the difference of opinion between the electricity supply industry and the public is due to the multiplicity of rates under which supplies are available. The main reason for the varied rates is due to the erroneous belief that the bulk of the main peak demands is due to lighting. This theory was no doubt accurate in the earliest days when motors were great rarities, and cooking, heating and other domestic uses were unheard of. Present-day peak loads occur, however, in most districts at the hour when the factories start or cease, when the traction loads are heaviest, at which hour, too, the middle class domestic users put their installations to their fullest use. In the evening almost the same thing occurs save, of course, that part of the factory load is replaced by that of cinemas, shops, restaurants, &c. The evening peak has been the most serious in general since the inception of electricity supplies, but the morning peak, with the spread of domestic use, is likely to be the larger in the future.

As most supply authorities base their rates, one way or another, upon the effect of each load upon the maximum demand, it would appear that shortly the fixed charge for the highly satisfactory domestic rates will have to be modified. Since, in most cases, these are based upon a calculated lighting demand, they bear little or no resemblance to the actual demand of the average domestic consumer with his cooker, water heater and most particularly his space heating, so carefully preserved for cold spells.

An alternative to this would be, of course, not to base rates on the demand caused. This is not quite so revolutionary as it first appears, since a perusal of power station performance figures gives a steady average cost per kWh over the majority of stations for many years, whilst for reasonable loads it can be shown that if the transmission costs exceed the generation costs a new power station is required where the load exists. Thus the theory that the demand charge pays for power plant can be dismissed, so that the unit charge should become not more than twice the generation costs and profit. Ths unit charge does not, however, include the costs of rendering accounts or the costs of, and profits to be expected from, providing the service given. Of these, the former can probably be accurately produced from existing records and costs, whilst the latter is calculable on capital per consumer basis.

It would appear therefore that supply of electricity for any purpose might easily be rendered on one scale or rate. Such a rate might well be devised as the first n units per annum at the existing flat lighting rate, the next m units per annum at a rate to be fixed, whilst the units over $n+m$ per annum could be at a rate equivalent to twice the cost of generation plus small profit, when the charge for the first n units might be equivalent to the cost of rendering account + cost of n units at the ultimate follow-on-charge.

Perhaps the greatest advantage of this proposed general electricity rate is that every consumer's account will be so simple that it can be rendered by machine, whilst rate queries and quibbles will be reduced to a minimum. At the same time, each consumer will require but one simple meter which might readily be of such a capacity as to be left in position for years, allowing for ample increase in load. Such a rate would not preclude the provision of special rates for night loads only or off-peak loads, nor should it be offered for standby supplies. As the general use of this rate would minimise the number of meters to be read and accounts to be rendered, so would the costs of rendering the accounts be reduced, thereby making it possible to further reduce the supply charge which would tend to become comparable throughout the country. Moreover, by making the values of $n + m$ uniform in all supply areas, there would be a great tendency towards a uniform rate throughout the country.

April 15th. DESDICHADA.

Arcs in Fluids

I was much interested in the reference in your issue of April 5th to the work of Dr. Slepian and Dr. T. E. Browne at Pittsburgh on the reason for the more rapid extinction of an arc when the fluid in which the break occurs is in motion. The idea, as you will be aware, is not a new one to this country. It was the researches of Mr. G. E. Whitehead into this phenomenon that led to the establishment of the principle of the pre-charged oil pump pressure-type circuit-breaker as long ago as 1929.

In this circuit-breaker, of which many hundreds are in commercial service, the oil is set in motion at high velocity past the contacts *before* the contacts part and the arc is struck. A notable effect to be seen in successful short-circuit tests on this type of circuit-breaker is the practically constant period of arc duration irrespective of the rupturing capacity duty. This quality has produced a remarkable consistency of operation.

We shall follow the researches of Dr. Slepian and Dr. T. E. Browne with more than ordinary interest.

WHITEHEAD SWITCHGEAR & INVENTIONS, LTD.,
Treforest, Glam., *April 9th.* R. GRETTON LOWE.

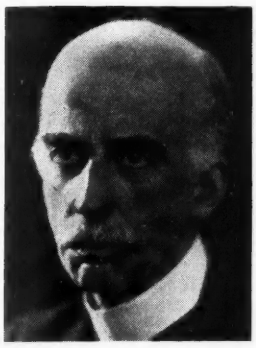
PERSONAL AND SOCIAL

Information regarding new appointments and other matters of interest for this page are welcomed

AT the meeting of the West Midlands Joint Electricity Authority, held on April 5th, the Mayor of Walsall, **Councilor J. Cliff Tibbits,** J.P., was appointed chairman of the Authority for the ensuing three years in succession to **Councillor H. Southan,** and **Alderman J. H. Wills,** J.P., was appointed vice-chairman for a similar term of office. Councillor Tibbits has been chairman of the Walsall Corporation Electricity Committee for the past eleven years and has represented the Corporation on the District Industrial Council for the Electricity Supply Industry (West Midlands No. 5 area), the District Joint Board of Employers & Staff Members, and the District Committee of Local Authorities and Chief Electrical Engineers.

Mr. H. T. Tilley has been appointed manager of the General Electric Co.'s London Engineering Department in succession to the late Mr. J. Mercer.

Dr. E. H. Rayner retired from the post of superintendent of the Electricity Department of the National Physical Laboratory on March 31st, having attained the age limit. He has



[Elliott & Fry.

Dr. E. H. Rayner and Mr. R. S. J. Spilsbury

been succeeded by **Mr. R. S. J. Spilsbury,** formerly principal scientific officer in the Department. **Mr. T. Smith,** F.R.S., has been appointed superintendent of a new Department of Light which comprises the former Optics Division of the Physics Department and the Photometry Division of the Electricity Department.

As a result of the entrance scholarship examinations held at Faraday House Electrical Engineering College on April 3rd, 4th and 5th the following awards have been made:—"Faraday" scholarship of 80 guineas a year tenable for two years in College and one year in one of the works affiliated with the College: Mr. C. A. Dodd (Staveley Grammar School). "Maxwell" scholarship of 60 guineas a year tenable for two years in College and one year in works: Mr. T. M. Palmer (Aldenham School). Exhibition of 60 guineas a year tenable for one year in College and one year in works: Mr. T. E. C. Smith (Staveley Grammar School). An entrance prize of 20 guineas: Mr. D. K. Hewitt, (Taunton School).

Sir Eugene Ramsden, Bart., M.P. for Bradford North, has accepted an invitation to join the board of the Yorkshire Electric Power Co. Sir Eugene, who is chairman of A. & S. Henry and Co., Ltd., and a director of other industrial concerns, is well known for the important part he has taken in matters relating to the development of overseas trade. He is a member of the Department of Overseas Trade Development Council.

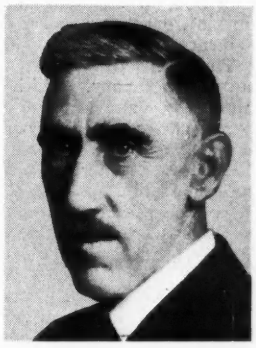
Mr. A. J. Grainger has been appointed sales manager of the Engineering Division of British Timken, Ltd. Previously he was the company's London sales representative.

At the annual general meeting of the F.B.I. held on April 10th **Lord Dudley Gordon** was elected president in succession to **Mr. P. Bennett,** who is now Director General of the Production of Tanks and Mechanical Transport at the Ministry of Supply. Lord Dudley Gordon is chairman of J. & E. Hall, Ltd.

The Birmingham Electric Club held a successful supper and smoking concert at the Grand Hotel, Birmingham, last Friday, at which 250 members and their friends were present. An enjoyable programme was greatly appreciated by those present. The president, Mr. J. Hamilton, was in the chair, and the principal guest was the president of the Coventry Electric Club, Mr. F. W. Godden. The arrangements were made by the hon. social secretary, Mr. A. T. Haywood.

Mr. R. Crampton, who has been on the staff of Newark Corporation Electricity Department since 1929, will on April 22nd take up an appointment as junior assistant engineer to the electrical and transport manager of Newport, Mon. For the past three years he has been part-time lecturer at the Newark Technical College.

Mr. Frank Gill, O.B.E., has been elected chairman of the Telephone Development Association for the current year in succession to **Mr. T. A. Eades.** Mr. Gill was formerly Engineer-in-Chief of the National Telephone Co. He is chairman of Standard Telephones and Cables, Ltd., Creed & Co., Ltd., and the International Marine Radio Co. He is a past-president of the Institution of Electrical Engineers of which he was elected an honorary member in 1938.



[Elliott & Fry.

Mr. Frank Gill, O.B.E.

Lord Dunglass has joined the board of the County of London Electric Supply Co., Ltd.

Mr. E. W. Keyes, wholesale electrical factor, Chester, has been elected an alderman of Chester. Mr. Keyes is deputy chairman of the Improvements Committee and of the Chester Joint Town Planning Advisory Committee.

Mr. A. A. B. Martin has been elected chairman of the Dundee Sub-Centre of the Institution of Electrical Engineers for 1940-41.

Mr. R. Bruce, of C. A. Parsons & Co., Ltd., has been nominated for the chairmanship of the North-Eastern Students' Section of the I.E.E. for the session 1940-41.

Mr. E. O. Lemon, B.Sc., A.M.I.E.E., has taken up an appointment with the Jackson Electric Stove Co., Ltd. He was district sales manager of the Central London Electricity Co., at the outbreak of war and took a commission in the R.N.V.R. For reasons of health he has received his discharge from the Navy.

Obituary

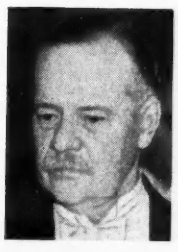
Mr. Gilbert W. Cross, of Drayton, whose death at the age of thirty-two is reported, was senior partner in the firm of Cross Brothers, electrical engineers.

Mrs. R. Broadbent.—We regret to record the death of Mrs. Rhoda Broadbent, wife of Mr. Frank Broadbent, who until a year or two ago was with the British Electrical & Allied Manufacturers' Association.

Mr. W. S. Every.—The death is announced of Mr. William Stephen Every, the London Passenger Transport Board's signal engineer and a past president of the Institution of Railway Signal Engineers. Mr. Every entered the service of the Underground Railways in 1905 as an inspector on the installation of signalling and in 1921 was appointed signal engineer and an officer of the company. He became signal engineer of the Board upon its establishment in 1933 and in 1939 he was made a principal officer. He was responsible for the design and installation of the whole of the new signalling under the £40,000,000 programme of new works and extensions.

Mr. Alexander Miller, secretary of Clyde Valley Electrical Power Co., died on Monday. Associated with the company for over thirty years, he had been secretary since 1933, succeeding Mr. H. E. Ferguson, who became general manager.

Mr. P. F. Rowell.—Members of all classes of the Institution of Electrical Engineers and many non-members within the industry will learn with deep regret of the death earlier this week of Mr. Percy Fitzpatrick Rowell, who, after thirty years' continuous service retired only last year at the age of 65 from the secretaryship of the Institution and the editorship of its journal of proceedings. Mr. Rowell was born in London on September 10th 1874, and was educated at the Royal College of Mauritius, which awarded him a gold medal for mathematics and a leaving scholarship in 1893. After a period at King's College, London, Mr. Rowell was appointed to the staff of the I.E.E. in 1901, becoming assistant secretary in 1904.



The late Mr. P. F. Rowell

Mr. Rowell was an honorary member of the Société Française des Electriciens, whose secretary sprang a surprise at the I.E.E. annual dinner in February, 1935, when, acting on behalf of the Government of France, he conferred upon Mr. Rowell the cross of an Officer of the Legion d'Honneur. Mr. Rowell's speech of acknowledgement was made in excellent French.

NEW ELECTRICAL PRODUCTS

A Review of Equipment Recently Marketed

Low-intensity Lighting Unit

AN inexpensive fitting for low-intensity illumination by means of ultra-violet light in conjunction with fluorescent paints and dyes is announced by the SLOAN ELECTRICAL CO., LTD., 54, Fetter Lane, London, E.C.4, which also supplies the fluorescent materials in standard colours in pint, quart and gallon containers.

"Slonetric" u.v. fitting

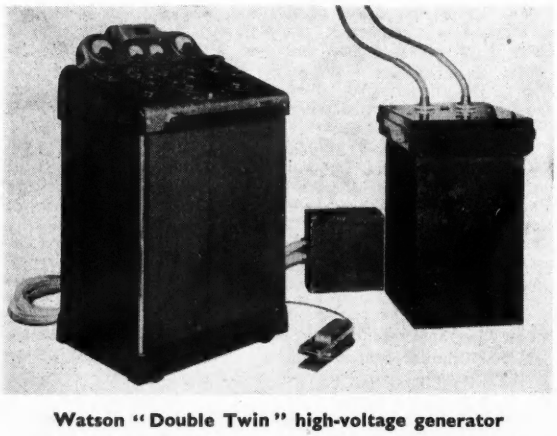
This "Slonetric" fitting has a metal canopy, which is watertight and tapped for three-quarter inch conduit entry, with a porcelain bayonet-cap holder to accommodate a lamp, up to 150 W in size, within a slightly conical sheet-metal reflector housing. An ultra-violet filter is incorporated, since the lamp is of the ordinary gas-filled type. Direct radiation is not visible from above and the shielding ensures that the light is concentrated within a prescribed area in the glareless and non-reflective manner called for by A.R.P. requirements.

Stainless Steel Electrode

A new stainless steel known as "Stainweld D" announced by the LINCOLN ELECTRIC CO., LTD., Welwyn Garden City, Herts, is suitable for arc-welding stainless steel of the 25 per cent. chromium, 20 per cent. nickel type. It can also be used for welding various stainless steels to mild steel and for the welding of steels which are air hardening and cannot be heat-treated after welding, such as armour plate.

X-ray Generator

Compared with single-valve or unrectified equipment, the advantages of two-valve generators of high voltage for X-ray purposes include an output large enough adequately to load



Watson "Double Twin" high-voltage generator

a modern tube and minimisation of electrical stresses on tube and cables due to unsuppressed inverse voltage, but they may be slightly more costly and have tended to be bulky. By contrast compactness and adaptability characterise the latest "Double Twin" generator offered by WATSON & SONS (ELECTRO-MEDICAL), LTD., 76, Castle Street, Reading.

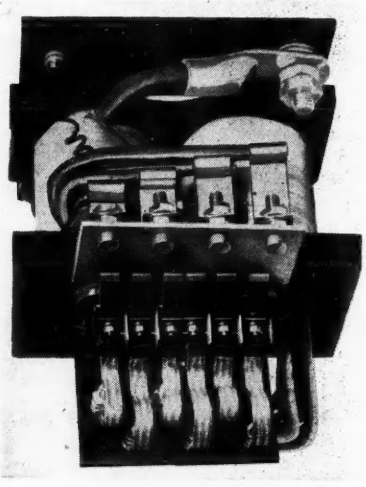
It is designed primarily for diagnostic work in conjunction with a double focus tube, both the tube and generator being fully shockproof, so that the high-voltage cables may simply be suspended from the ceiling by a spring to afford flexibility of movement. The output is 100 mA at 100 kV or 150 mA at 65 kV (both peak voltages). The main and filament transformers and the two valves are all oil immersed within a single metal container of modest dimensions.

The control table incorporates twelve regulators and switches, four indicating meters, toroidal-type resistances and a separate foot switch for screening. Interlocking prevents the tube being overloaded beyond its safe limit under "automatic" control, but "free" control can also be exercised to permit the operator to use his own judgment or refer to a technique chart supplied with the apparatus. The timer switch is positively driven by a synchronous motor, not clockwork, and its dial is logarithmically calibrated so that at each successive setting the increase in film blackening is constant; repeat exposures are made without resetting the timer.

Automatic Cut-outs

The new non-mercurial battery cut-in and cut-out made by CRYPTON EQUIPMENT, LTD., North Acton Road, Park Royal, London, N.W.10, is simple in construction, sensitive and exceptionally robust.

The reverse current is unusually low and as mercury is not employed the cut-out can be used in horizontal or vertical positions without interference with its operation. It is useful for portable battery charging equipment, avoiding the disadvantages of mercury type cut-outs due to the liquidity of the mercury and the difficulties of capillary attraction which occur when current passes through the mercury.



Crypton 400-A open type non-mercurial cut-out for horizontal mounting

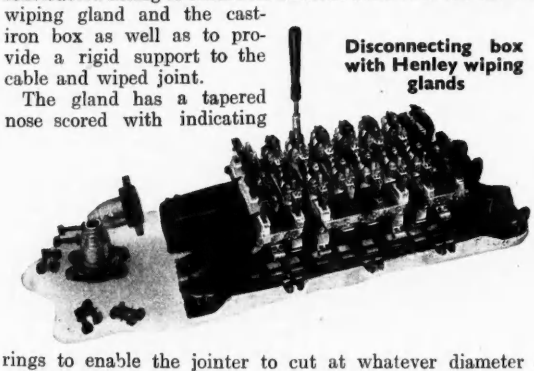
The apparatus comprises a core with a shunt winding across the charging supply and a series winding in series with the charging supply and battery, and carrying the charging current. When the voltage of the charging supply exceeds the battery voltage, the shunt winding closes the charging circuit and the current which flows in the series winding increases the pull of the cut-out armature, ensuring maximum contact. The series winding keeps the charging contacts closed until the charging current has dropped near to zero value. This arrangement ensures that the charging circuit is broken at minimum current values and prevents a reverse current even of relatively small value flowing from the battery back through the charging circuit. The average reverse current required to open the charging circuit is in the region of from 2 to 4 per cent.

Easy means for adjusting the pulling-in value of the armature are provided, enabling the cut-out to be used over a wide voltage range, and provision is also made for adjustment of the air and magnetic gaps and the setting of these gaps by calibrated stops. The cut-out connections are brought out to insulated terminals secured on the cut-out frame.

Wiping Glands

The introduction by W. T. HENLEY'S TELEGRAPH WORKS CO., LTD., Milton Court, Westcott, Dorking, Surrey, of the Henley bolt-on brass wiping gland is a change over to a more heavily constructed fitting to ensure an efficient bond between the brass wiping gland and the cast-iron box as well as to provide a rigid support to the cable and wiped joint.

The gland has a tapered nose scored with indicating



Disconnecting box with Henley wiping glands

rings to enable the jointer to cut at whatever diameter of cable entry is required. The brass gland is secured to the cast-iron box by a cast-iron ring, fixed by four bolts, which has a wide face with a ground surface to ensure an effective bond.

COMMERCIAL and INDUSTRIAL NEWS

Effects of Paper Rationing. New Uses for Fluorescent Lighting. The French Electrical Industry in Wartime. Marine Electrification.

Make Sure of Your "Review"

THE recent drastic revision of the paper ration for newspapers means that from now on no surplus copies of trade and technical journals will be available. Consequently we urge readers to make sure of receiving their ELECTRICAL REVIEW by asking their newsagents to reserve a copy each week. Casual purchase will not be possible in future.

Our Index to Advertisers' Products is being discontinued next week as a result of the rationing scheme. Readers seeking information under this heading should refer to recent issues until such time as we are able to reinstate the index.

Assuan Dam Scheme

A *Reuter* message from Cairo says that it is understood that the British Government is giving an all-in guarantee in respect of the Assuan dam electrification scheme. In December a special Egyptian Government Committee reported that the scheme was too costly for the Government. It was estimated that it would need about £10,000,000.

Industrial Area Organisation

The Ministry of Supply announces the formation of an Area Advisory Committee at Edinburgh. The members include Mr. G. L. Kirkpatrick, of Bruce Peebles & Co., Ltd.

The newly formed Reading Committee numbers among its members Messrs. J. E. Blackshaw (G. D. Peters & Co., Ltd.), O. E. Mueller (Pressed Steel Co., Ltd.), R. F. Newman (J. I. Thornycroft & Co., Ltd.), and Col. L. G. Pilkington (Pulsometer Engineering Co., Ltd.).

The members of the Committee for the Preston area whose formation is also announced, include Mr. F. J. Jones (Siemens Electric Lamps & Supplies, Ltd.) and Mr. D. P. Welman, A.M.I.E.E. (Foster, Yates & Thom, Ltd.).

American Activity in Brazil

Reuter reports that the United States Export-Import Bank of Washington has agreed to participate in extending about $6,000,000 for financing sales of railway equipment to Brazil by the American General Electric Co., the Westinghouse Electric & Manufacturing Co. and the Inland Steel Co.

E.A.W. North-Western Area Conference

The North-West England and North Wales Area of the Electrical Association for Women held a one-day conference at Blackpool on April 11th, about 270 members attending from the sixteen branches in the area. At the morning session Mrs. B. T. Hawkins, chairman of the area, presided, and Miss Caroline Haslett, director of the Association, spoke of the work of the Association in wartime, stressing the vital part played by homemakers in the national effort. After luncheon, at which members were addressed by the Mayor of Blackpool (Alderman E. Stevenson) and Mr. B. T. Hawkins (borough electrical engineer of Wallasey), a talk was given by Miss Sali Lobel, founder of Every Woman's Health Movement.

The Political Shadow

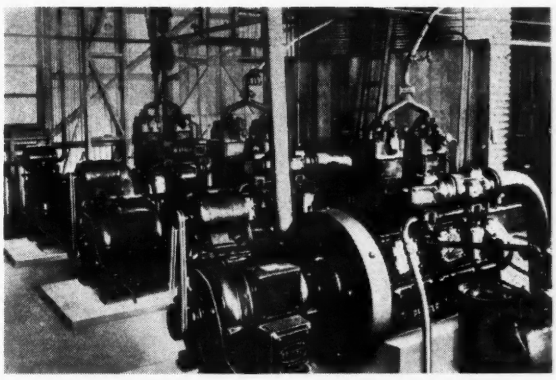
Speaking at a luncheon of the Mid-East England Centre of the I.M.E.A. at Leeds last week, Mr. T. Roles, city electrical engineer, Bradford, counselled the supply industry to be watchful of political interference by local councils.

The chairman of the centre, Mr. F. Newey (Lincoln), in the course of a speech said, according to the *Yorkshire Post*, that electricity supply was a national service and could only be dealt with on the basis of national ownership. The president of the Association (Mr. J. T. Mould, Leicester) urged chief officials and members of electricity committees to be prepared for constructive social legislation after the war.

"Philora" fluorescent discharge lamps are used for twenty-four hours a day lighting in this machine shop

"Alpine" Power Plant

A new chalet has been erected at Charlotte Pass, Kosciusko, the "alpine" playground of Australia and the rendezvous of hundreds of ski enthusiasts from June to October. The electric plant is housed in a separate building 50 yards to the rear of the chalet, and electricity is generated by three 30-HP Diesel engines, connected with three 415-V., three-phase AC alternators each of 16 kW capacity. As the maximum demand on the plant is 30 kW one engine is almost continuously in reserve. This plant is practically noiseless in operation. The engines are Petter twin-cylinder atomic Diesel units.



Petter Diesel engines at the New Chalet, Kosciusko, N.S.W

Southampton Docks

Southampton is recognised as one of the foremost commercial seaports of Britain, and in this respect commends itself to the attention of the shipowner, merchant and business man interested in the maritime trade of the country. The 1940 edition of the Handbook of Rates, Charges and General Information Relating to the Southampton Docks which has just been published by the Southern Railway Co. is therefore of particular interest to all engaged in export and import trade. It tells the story of the provision made for shipping at this port, containing details particulars with profuse illustrations.

Machine Shop Lighting

The pressure of work existing in most large machine shops to-day makes exacting demands on men, machinery and equipment. There is little margin for error, and in order to maintain the high standard of precision required, it is of the greatest importance that operatives should work under the best possible lighting conditions. An excellent example of what can be accomplished in this direction is the machine shop illustrated, where the installation, which is used for twenty-four hours daily, was planned to eliminate all shadows and to give an overall intensity of 10 f.c. throughout the whole machine shop. The illumination is provided by 157 400-W and seven 80-W "Philora" lamps of the fluorescent mercury discharge type, housed in Verity's "Verikool" dispersive reflectors and (for the high centre bay) parabolic angle reflectors. This combination gives a total absence of glare and excellent distribution. Several workmen whose opinions were invited stated that "it was easier to work by than daylight."

Two Bathroom Fatalities

Inquests were held last week on two men who were found dead in their bathrooms. The first, a Grimsby man, apparently took a portable fire into the bathroom and plugged it into a lampholder. It was stated in evidence that an extension of the heater flex had recently been made by an "electrician." The joint was defective and two-core flex had been attached to the original connection. In the second case a South Wales man was said

to have been using an "electric reflector ray lamp" while in the bath. Inspection disclosed that in this case, too, faulty wiring had caused the metalwork to become "alive."

French Contractors' Organisation

Monsieur Jules Verger, president of the General Syndicate of Electrical Contractors in France, has informed the Minister of Labour that the wartime organisation of the electrical contracting industry is now ready. The Syndicate has made a general survey of the whole industry, and is to maintain a complete register of the industry. When the Government requires urgent work to be done it will notify the Syndicate, which will be in position to inform the Government within half an hour what contractors within a reasonable distance of the place at which the work is to be done have the necessary equipment and men to complete the job within the time limits imposed. A register of technical experts is also maintained, so that the Government can obtain advice in drawing up projects in as short a time as possible. Details of the Syndicate's services have also been placed before the Ministry of Posts and Telegraphs and the Ministry of Armament.

Women in French Electrical Industry

The Minister of Labour has issued an order under the recent decree-law rendering the employment of women in certain work obligatory. The order specifies the conditions under which women may be employed in all establishments "holding Government contracts or sub-contracts for the Ministries of Armament, of the Marine or of the Air." This will include a very large number of the manufacturers of electrical apparatus who will find themselves obliged to make use of a proportion of women specified in a schedule to the order. The proportion varies rather considerably according to the work; thus, 65 per cent. of draughtsmen must in future be women, while women must be employed to the extent of 90 per cent. for such work as electrolysis, cabling of motors, testing of machines and apparatus of all kinds and inserting the filaments in lamps. For the assembly of wireless apparatus produced in series, 60 per cent. of women must be used, and for coil winding 80 per cent. Provision is made for suitable periods of training.

Imports from France

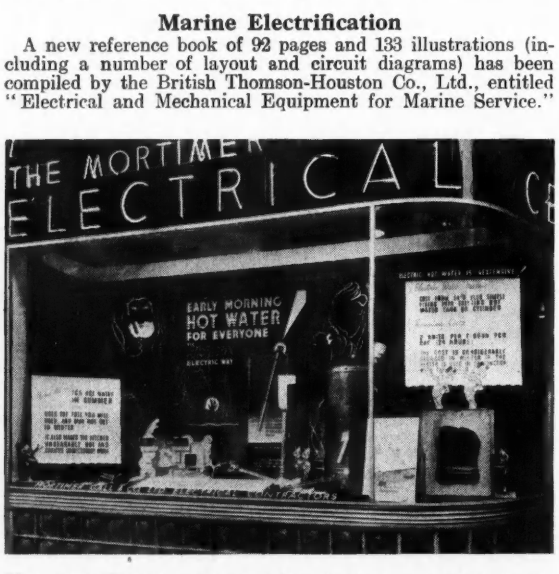
As a result of the understanding reached between the British and French Governments, a new Open General Licence has been instituted permitting the importation of certain goods from France and the French Possessions without individual licences. These goods include illuminating glassware, electric bell apparatus and connectors, couplings, junction boxes, fuses, fuse-boxes and parts thereof.

Turkish Electrical Imports

The *Board of Trade Journal* states that the value of electric motors imported into Turkey during the quarter ended December 31st last was £T200,000, as compared with £T856,000 in the corresponding period of 1938.

Marine Electrification

A new reference book of 92 pages and 133 illustrations (including a number of layout and circuit diagrams) has been compiled by the British Thomson-Houston Co., Ltd., entitled "Electrical and Mechanical Equipment for Marine Service."



Hotpoint electric water heating display recently installed in the showrooms of Mortimer Gall & Co., Ltd., Cannon Street, E.C.4

The book is divided into two main sections, one dealing with propulsion and the other with auxiliary gear; there is also an adequate index.

In the first part are set out the arguments for electric propulsion based on the company's experience in this connection since the pioneer British installation on the "San Benito" nearly twenty years ago. This is followed by discussions of the main features of turbo- and Diesel-electric systems, the latter being considered under the headings of AC and of DC with Ward-Leonard control, modified to suit the load characteristics of the propeller. Two methods of applying this control are described—the constant-current, chiefly used on single or twin-screw tugs and double-ended ferry boats, and the constant-voltage arrangement for small vessels in which machinery space is limited—both of which are designed to prevent overloading automatically. Particulars are also given relating to the use of exhaust steam from the main engine for driving an exhaust-steam turbo-generator for supplying power to an auxiliary motor on the propeller shaft.

The second section covers such varied items as auxiliary generating and emergency sets, scavenging blowers, gearing, motors and control gear, fault detection, switchgear, lighting, cooking and sound film equipments. Leading technical particulars are given of generating plant installed in various ships, whether for propulsion or for auxiliary service.

Photographer Fined

At Hastings recently a young man was fined £2 for taking a photograph of electrical equipment at Hastings without authority. It was stated that he was seen photographing a "pylon" of the grid system. The chairman of the magistrates said that it was the defendants' duty to be aware of the regulations.

Greek Import Duties

Recent alterations in the Greek Customs tariff include the imposition of import duties on the following classes of goods:—Electrical appliances in bakelite, i.e., contacts, contact-breakers, wall plugs, sockets, boxes, junctions, &c., 120 metallic drachmæ per 100 kg. Hand or automatic switches and fuses, covers and cases of any material, 50 drachmæ per 100 kg. Clockwork mechanical switches of any material, 20 per cent. *ad valorem*. Pieces comprising switchboards, in porcelain, and all other electrical appliances in porcelain not elsewhere specified, i.e., contacts, switches, wall plugs, sockets, &c., 50 drachmæ per 100 kg.

Belgian Electrical Imports and Exports

The following table shows the Belgian imports and exports of electrical machinery, apparatus and cognate material during 1939 as compared with the preceding year. The values against the separate items are in thousands of Belgian francs, the total in sterling at 118 fr. having been added for purposes of comparison. It will be seen that both the imports and exports underwent a marked decline during the past year.

	Imports		Exports	
	1938 (1,000 fr.)	1939 (1,000 fr.)	1938 (1,000 fr.)	1939 (1,000 fr.)
Generators, motors and rotary convertors	41,356	43,138	15,497	17,607
Static transformers	10,485	7,498	13,025	19,904
Mercury and other rectifiers	893	356	129	93
Other dynamo-electric machinery	12,831	8,134	18,797	12,410
Dry batteries	4,362	6,551	216	1,621
Accumulators and parts	2,404	2,529	3,992	4,644
Magnets (other than electro-magnets)	3,020	1,923	32	1
Land and submarine cables	1,772	1,570	87,291	10,799
Insulated wires and cables	14,951	11,933	70,778	66,579
Copper wire and cables (not insulated)	266	253	14,666	8,880
Carbons and electrodes	7,872	9,685	149	113
Porcelain insulators, etc.	4,350	1,804	437	1,127
Electric globes, bulbs and glassware	8,538	7,271	8,655	5,275
Insulating tubes, junction boxes, etc.	2,577	1,712	1,517	1,338
Other insulating material	4,011	2,968	371	436
Arc lamps	127	129	2	5
Incandescent lamps	19,424	16,235	17,878	21,191
Radio valves	20,111	12,184	1,346	1,094
Electric measuring instruments	22,533	17,931	3,306	3,745
Telegraph and telephone apparatus	5,162	4,599	137,516	122,123
Radio transmitting and receiving apparatus	13,198	7,004	14,336	11,922
Radio sets, not assembled	2,307	947	12,398	13,713
Loudspeakers and microphones	3,977	2,931	1,460	2,136
Other radio parts	10,840	5,511	2,027	1,536
Other electrical apparatus and goods	163,911	133,073	33,315	27,771
Total fr.	381,278,000	307,869,000	459,136,000	356,063,000
Total £ at 118 fr. to £	£3,231,170	£2,609,060	£3,890,900	£3,017,483

A Works Change-over

In the description of the plant at the works of Fielding & Platt, Ltd., on page 405 of our April 5th issue, an ironclad distribution board was stated to have been supplied by H. Holmes & Co. This should, of course, have been J. H. Holmes & Co., Ltd.

Electrified Laundry

Referring to the article under the above heading in the ELECTRICAL REVIEW on April 12th, p. 419, we now learn that several of the motors employed on the installation are products of Lancashire Dynamo & Crypto, Ltd. These include the drives and the Watson-Laidlaw hydro-extractors and the variable-speed motor driving the roll of the table-linen ironer.

Electrical Installation in the Himalayas

Set in twenty-five acres of beautiful grounds at an altitude of 8,500 ft. above sea level and about six miles from Simla, "Wildflower Hall" Hotel, Mahasu, near Simla, commands magnificient views of the snowy peaks of the Himalays extending over 150 miles. The hotel was built in 1912 and has accommodation for 50 people. Recently electric light has replaced

the old kerosene lamps, adding greatly to its comfort and reducing the risk of fire. Henley metal sheathed cables were used throughout, spaced off walls and ironwork by means of narrow teakwood strips. The plant includes two Ruston Diesel 7½-HP engines direct coupled to Crompton Parkinson 3-kW, 110/155-V battery charging dynamos, with a switchboard comprising two generator panels equipped with overload and reverse current switches, a battery and a feeder panel. Normally, 4½-HP engines would be large enough to drive 3-kW dynamos at sea level, but on account of the rarefied atmosphere at 8,500 ft. 7½-HP engines were necessary. A 60-cell Tudor battery, having a capacity of 291 Ah at the 10-hour rate, has been installed principally to take the night load and to help during peak periods. There are 235 lighting points. Each residential room is fitted with pendant and table lights controlled by a "two-way and off" switch arranged to prevent more than one light being in use at a time, thus avoiding overloading of the plant. Henley cables were also used for road lighting and Henley rubber insulated and cotton-covered wires for the bells. Hotz & Co. carried out the installation, under the supervision of Mr. R. Hotz, A.M.I.E.E., and Mr. A. H. Pook, M.I.E.E., who was responsible for the design and construction of the power house.

A Large Ignition Set

A large ignition set for use in the West Indies has been designed and manufactured complete by Lodge Plugs, Ltd., of Rugby. The equipment, which is fitted to a 1,600-H.P. engine manufactured by the Crossley-Premier Gas Engine Co., Ltd., operating on natural gas, consists of twelve large sized, double-output high tension coils operated from 10-V nickel-iron batteries, supplying two plugs per cylinder. Each sparking plug is 15-in. long. The two special six-way contact makers run at half engine speed, and incorporate micrometer adjustment for the timing of each cylinder. Apart from the difficulty of excluding minute insects from the intricate mechanism, it has been necessary to make the equipment proof against tropical conditions and the attentions of negro mechanics.

Kempe's Engineer's Year Book

"Kempe's Engineer's Year Book" has long since established itself as an indispensable reference book for all engineers and the 1940 edition, which has been carefully checked and revised under the direction of the editor of *The Engineer*, brings together all the technical information which engineers have to use day by day. The volume is profusely illustrated and includes a comprehensive index of about eighty pages containing 12,000 entries. The price of the book is 31s. 6d. and the publishers are Morgan Brothers (Publishers), Ltd., 28, Essex Street, Strand, W.C.2.

London Contractors' New Premises

The war has had a varying effect on the business of electrical installation contractors, but Wm. Steward & Co., Ltd., inform us that with them business has been particularly brisk and they have found it necessary to move into larger premises at 154, Albany Street, London, N.W.1 (telephone: Euston 3763). The change is necessitated by the expansion both on the installation side and in the new department dealing with fabricated ironclad switchboards. The company also has a special department dealing with service and maintenance of all types of industrial electrical equipment.

Price Increases

Belling & Co., Ltd., have further increased the prices of their electric cookers and parts to 15 per cent. above pre-war levels.

Morphy Richards, Ltd., also announce increases in the prices of their auto-control electric irons.

Prices of Materials

Henry Gardner & Co., Ltd., report April 16th: No change in the price of copper bars (best selected), sheet and rod, English pig lead, spelter, and mercury. English block tin, £263 10s., £2 10s. increase. No changes in the prices of materials were reported on April 16th by Edward Till & Co. (india-rubber, Para fine), and F. Smith & Co. (electrolytic copper bars, wire rods and h.c. wire).

Fluorescent Display Effects

Due to the restrictions on lighting, the shortage of materials, and the curtailment of advertising appropriations, the ingenuity of advertising managers and agents in devising window and interior displays has never been so sorely taxed as during the last few months. Among the ideas which have been utilised to good effect are fluorescent effects obtained by the activation of special powders by ultra-violet light, and a good example is to be seen in an installation carried out by the General Electric Co., Ltd., for the Yorkshire Brick Co. at its Doncaster showrooms, which consist of four three-walled rooms entirely constructed from bricks. The rooms themselves are panelled, each panel and pillar being composed of a different type of brick. The use of fluorescence enhances the beauty of the design. To accentuate the shape, texture, and arrangement of the bricks, the pointing has been picked out in colour, and flowers, creepers, garden furniture, window lights, and even lamp glasses give added interest and charm, when activated by ultra-violet light.

The main room represents a garden loggia with a window of a mullioned diamond leaded light design, behind which is a sheet of orange yellow "Rhodoid," which, when under the influence of the "black" lamp, provides a cheerful sunlight glow. A realistic bed of flowers, also made of coloured "Rhodoid," lies beneath the window. The effect of brickwork under the contrasting lights of the sun and moon is produced in the adjacent "transformation" room by a series of special lighting fittings of the "Gecoray" type. In the other two rooms straightforward lighting effects are utilised.

The "transformation" room at the Yorkshire Brick Co's showrooms where effective use is made of fluorescent lighting

Damages for Miners' Relatives

A total of £2,650 damages was awarded to the wife of one man and the grandmother of another who were killed by an explosion at the New Haden Colliery, near Cheadle, in March last year. In his judgment Mr. Justice Wrottesley said that he was satisfied that the explosion was due to a spark from a connector on a coalcutter which had not been properly pushed home. The plaintiffs based their claim on the failure of the colliery company to ensure adequate ventilation, to prevent the accumulation of gases, and to provide a flameproof coalcutter. He held that while the ventilation system would deal adequately with an accumulation of gas which might reasonably be expected to occur it failed to comply with the Act. On the other claim the Judge said that he could not say that the defendants used electricity in a part where its use would be dangerous to life. He understood that electric coalcutters designed to make impossible such sparking as had occurred had now been introduced into the mine.

A stay of execution pending a possible appeal was granted subject to certain payments to the plaintiffs. Costs were awarded against the colliery company.

The Electric Supply Corporation's Interests

In our last week's "Stocks and Shares" notes it was stated that the Electric Supply Corporation was "interested" in the Hendon Electric Supply Co. We are reminded that the Corporation disposed of its interest in this company to the Northmet Power Co. in 1938.

The London Electrical Co.

In our last issue we published the annual return of capital of the London Electrical Co. (Sherborne Lane), Ltd. The company informs us that since the date of the return the capital has been raised to £14,000, of which £13,707 has been issued.

Trade Announcements

E. R. Morton, Ltd., have removed to 37, Norfolk Street, Strand, London, W.C.2. (telephone: Temple Bar 4573-4).

Iron Bridge Service Depôt, Ltd., Uxbridge Road, Southall, has been appointed a distributor for Morrison electric vehicles in the Western Home Counties.

Bulson Bros., electrical engineers and contractors, of Chippenham and Calne, have acquired the business of Howell Bros. and Hawkins, of Devizes, and are opening a new branch establishment at 4, Estcourt Street, Devizes.

R. B. Pullin & Co., Ltd., has acquired the issued share capital of Measuring Instruments (Pullin), Ltd., Seaford Works, Seaford Road, West Ealing, W.13. The old directorate

(*Continued at foot of page* 462.)

ELECTRICITY SUPPLY

Restrictions Relaxed at Bedford. Bradford Appointment Controversy.

Barrow-in-Furness.—SUPPLY TO SAWMILLS.—At a cost of £200 the Electricity Committee is to extend the mains to supply sawmills at Hawkshead Hill.

HEATING FLAT RATE RESTRICTION.—The Committee has decided that the flat rate heating tariff shall only apply to consumers who take a reasonable amount of electricity for other purposes.

CHANGE-OVER SCHEME.—Application has been made for sanction to a loan of £5,200 in connection with the change-over from DC to AC in the Vickerstown North and South districts.

Bedford.—WARTIME MEASURES MODIFIED.—In October last the Town Council decided to discontinue, for the time being, the laying of electricity services free of charge on consumers' premises. It is now proposed, however, to recommence the former practice of laying house service cables free of cost up to a specified length. This will apply to new connections on the route of existing cables. With the object of disposing of existing stocks of new and reconditioned appliances the Council has also authorised the reintroduction of hire-purchase and simple hire of electric cookers.

LOAN SANCTIONS.—The Electricity Committee has obtained sanction to borrow £3,250 for buildings, £4,228 for mains and £13,292 for plant.

Bradford.—APPOINTMENT OF BUSINESS MANAGER SUGGESTED.—As briefly reported in our last issue, the City Council on April 9th decided that the appointment of a successor to Mr. T. Roles, the retiring city electrical engineer, should be deferred until the special committee set up to inquire into the administration of the Electricity Department had made its final report. The Electricity Committee had recommended that the salary for the position should be £1,600 a year, rising to £1,750 by biennial increments of £50, and that subject to this Mr. W. Dundas, the present deputy, should be appointed as from June 27th. The decision to defer the matter was taken on an amendment by Councillor R. C. Ruth which was adopted by 44 votes to 18. During the discussion Alderman T. J. Robinson said it was demanding too much of a professional man to ask him to take charge of so huge a department and also to act as business manager. They should appoint a qualified business manager. Opposing the amendment, Alderman J. W. Longley, chairman of the Electricity Committee, said that whatever the result of the investigation might be—and he had not the slightest fears of it—it would not influence this appointment.

DISTRIBUTION PROPOSALS.—The Electricity Department proposes to provide a supply to Victoria Mill, Eccleshill, at a cost of £2,098. Mains are to be extended to, and a substation erected on the premises of Jowett Cars, Ltd., Idle (£2,530) and a substation is also to be built at Moor Ironworks estate which, together with mains extensions, will cost £12,818.

Clifton and Micklebring (Yorks).—PETITION FOR ELECTRICITY.—Some 50 residents have signed a petition, which has been sent to Mr. Tom Williams, M.P., appealing for assistance in securing the provision of an electricity supply for the area from the Yorkshire Electric Power Co., Ltd.

Dorchester.—ELECTRIC PUMPING.—The Corporation Water Committee is to install electric pumping plant at an estimated cost of £500.

Eton Wick.—LACK OF ELECTRICITY SUPPLY.—Referring to a statement at the Eton Council meeting that electricity would not be available at Eton Wick until after the war, the *Windsor Express* points out that this will not only be a hardship for householders who have had their houses wired, but will be a serious matter for the Council which needs electricity for its pumping station. It urges the Council to persist in its attempts to obtain a supply.

Glasgow.—HOSPITAL HEATING.—The Health Special Sub-committee recommends that the present heating system in the old buildings at Hawkhead Mental Hospital should be replaced by a system of electrode boilers.

Gloucester.—HIRE OF COOKERS DISCONTINUED.—It has been decided to discontinue for the present, the hiring out of cookers by the Electricity Department. An amendment for the reference back of the proposal was defeated at the last meeting of the Council.

Gravesend. — DISTRIBUTION PROJECTS. — Among schemes approved by the Electricity Committee are the installation of new switchgear at the "El-teb" substation, costing £2,330, the provision of a new high-voltage feeder for a duplicate supply to Henley's works at a cost of £4,900, and the construction of a substation for giving a supply to new police and fire stations in Woodville Terrace, involving an expenditure of £1,400.

Haslingden.—CONTRIBUTION TO RATES.—The Electricity Department is contributing £1,000 in aid of the rates.

Norwich.—SCHEME MODIFIED.—It has been found impossible to complete the new Duke Street stores and workshops of the Electricity Department as originally designed owing to Treasury restrictions on the borrowing of money. A considerable rearrangement of the space available in parts of the new building will be necessary in order that the administrative staff shall be accommodated to the best advantage. When the section of the building which has been sanctioned is completed it will still leave a gap in the Duke Street frontage.

LIGHTING IN SHELTERS.—The Town Council is considering the installation of electric light in air-raid shelters at an estimated cost of £2,659.

(*Continued on page* 463)

Commercial and Industrial News (*Concluded from previous page*)

has resigned, and the present directors of R. B. Pullin & Co., Ltd., have assumed office.

The W.E. Highfield Shield Competition

The W. E. Highfield Shield Competition of the Association of Supervising Electrical Engineers will be held as usual this year. All papers, addressed to the general secretary, must reach the Association, Aldwych House, London, W.C.2, not later than October 8th, 1940. It is expected that the decision of the Examining Board will be announced in time for the presentation of the Shield and prizes at the lecture meeting on December 17th.

Calendars

M.C.L. & Repetition, Ltd., Pool Lane, Langley, Birmingham, has sent us a desk calendar for 1940-41 with daily slips, each of which bears a quotation. The calendar is mounted on a strong card illustrating some of the company's products.

When planning evening engagements in these days it is often useful to know the nights on which the greatest benefit can be obtained from the moonlight. The publication, therefore, by the Rawlplug Co., Ltd., of a moonlight calendar will appeal to many.

Mary Ann Domestic Appliances

To minimise the difficulties arising from war conditions by simplifying the handling of orders and accounts, the selling organisation for "Mary Ann" domestic appliances has been transferred from British Electric Domestic Appliances (1938), Ltd., to Thorn Electrical Industries, Ltd., 105/109, Judd Street, London, W.C.1, where a new Mary Ann Domestic Appliances Department (telephone: Euston 1183, Extension 16) has been set up, and all correspondence relating to sales should be sent to that address. The service and spares departments are remaining with the factory at Wallington, and goods and communications for them should be addressed as usual to 27, Sandy Lane North, Wallington, Surrey.

New Catalogues and Lists

General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.—Catalogue section X2 dealing with high- and low-voltage switchgear for pole or wall mounting. Also a price variation sheet (No. 3) and a 40-page brochure (price 6d.) on G.E.C. automatic cookers and their use.

Ralph E. Smart, Ltd., India Works, Havelock Road, Southall, Middlesex.—A leaflet describing the "Antlia" float-less pump control system.

Nife Batteries, Ltd., Hunt End Works, Redditch.—Publication No. 440 dealing with steel-plate batteries for electric trucks, &c.

Revo Electric Co., Ltd., Tipton, Staffs.—Catalogue No. 17 of electric lighting equipment contains over 300 pages covering enclosed industrial and outside units; reflector fittings; fittings for shop, office, showroom, etc.; floodlighting; street lighting; lighting brackets; street lighting standards; lighting control gear; hand lamps; bulkhead fittings; ship fittings; and accessories. The publication contains illustrations not only of the apparatus itself but also of typical installations.

Information Department

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, &c., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following:—

Address of V.H. Jackson & Co., Ltd., makers of automatic carbon arc tube welding plant.

PIXILITE lighting (temporary).

KEYWAY hair dryer.

Pressure type storage water heater 1½-gal. capacity.

Oban.—Sale of Power Plant.—Faced with the necessity of spending £40,000 on extending the municipal electricity works, the Town Council at its last meeting decided to sell the works to the Grampian Electricity Supply Co. for £12,500, and to take a bulk supply from the Company.

Portsmouth.—High-Voltage Mains.—In order to avoid overloading it is necessary to lay new high-voltage mains, and application is being made for permission to borrow £27,000 to cover the cost of the work.

Supply to Waterworks.—The Electricity Committee has recommended the supplying of electricity to Chichester waterworks at 1d. per kWh for the first 5,000 kWh per quarter and ½d. per kWh thereafter, subject to a coal clause and the restriction of the demand during peak load periods.

Rochdale.—Uneconomic Consumers.—Since the Electricity Department last year imposed a minimum charge of 6s. per annum for power supplies to domestic consumers, it has been represented that some users, attracted by the publicity of the Department, had installed a power circuit in their homes on the understanding that they would only have to pay the meter rent of 9d. per quarter and could then obtain power at 1d. per kWh. On behalf of the Department it has been contended that it should not become a practice to subsidise small consumers. The accounts of 107 consumers showed a total revenue of £7 1s. 4d. in a quarter, an average of 1s. 6d. per consumer. Thirty-four of these paid only 15s. 4d. among them—less than 6d. per head. Since the minimum charge was inaugurated, 278 meters had been returned, which saved a capital sum of £680, plus an approximate average cost of 5s. per meter per annum for upkeep charges.

Rushden.—New Substation.—The Rushden and District Electric Supply Co. is to erect a substation at Lawton Road, Rushden, and another is to be constructed for William Green & Son, at Allen Road, Rushden.

Southport.—Rate Contributions.—The Finance Committee is requesting the Electricity Committee and the Transport Committee each to make a contribution of £2,625 to the rates.

Strood.—Lighting Wardens' Posts.—At a recent meeting of the Rural District Council it was decided that estimates should be obtained for the extension of the electricity supply to all wardens' posts in the district where the Kent Electric Power Co.'s mains are within a reasonable distance.

Swindon.—Supply to Factory.—The Electricity Committee is to provide a supply to the Stratton factory of the Plessey Co., Ltd., at a cost of £10,000.

Thurrock.—Higher Charges.—The two electricity undertakings owned by the Council—those of Grays and Tilbury—reported increases in tariffs at a recent meeting of the U.D.C. Councillor F. G. Groot, chairman of the Grays Electricity Committee, said that the increases were 25 per cent. on the charges in operation at the beginning of the war.

Worksop.—Tariff Revision.—A sub-committee appointed to consider the revision of tariffs has recommended the cancellation of the free hire of appliances, an increase of 20 per cent. (instead of 12½ per cent.) in all special tariffs except those under sealed agreement, and a complete scheme of new tariffs for lighting and heating. The recommendations have been approved by the Council.

Overseas

Greece.—Increased Electricity Production.—The latest available report (for 1938) of the Société d'Electricité Athenes-Piree, which is responsible for about two-thirds of the output of electricity in Greece, shows that approximately 205 million kWh was generated, as compared with 181 million kWh in 1937, an increase of 12 per cent.

Morocco.—Electrical Development.—During 1938 there was an increase of 11 per cent. in the output of electricity in Morocco, according to an article in *Le Genie Civil*. The total for the year was 140.7 million kWh compared with 125.7 million kWh in the preceding year. About 78 per cent. of the supply was furnished by hydro-electric plants.

Russia.—Hydro-electric Project in Altai Mountains.—Work has been commenced on the construction of a 240,000-kW hydro-electric power station on the Irtysh River, six miles from the town of Ust-Kamenogorsk in Eastern Kazakhstan. The new plant will stimulate the development of the Soviet non-ferrous metals industry. The Altai mountains contain nearly half of the known resources of lead and zinc in the U.S.S.R., as well as large deposits of copper, sulphur, barites, gold and other minerals. It will also facilitate the development of the chemical and other industries.

Sardinia.—New Power Station.—A new power station with a capacity of 50,000 kVA, established at Santa Caterina by the Societa Elettrica Sarda, has been specially designed to employ as fuel the coal mined on the island and to use distilled sea water for the boilers. The output is stepped up to 70 kV for transmission to the Carbonia coal mining district and to the town of Villaser, where a connection is made with the distribution system of the island.

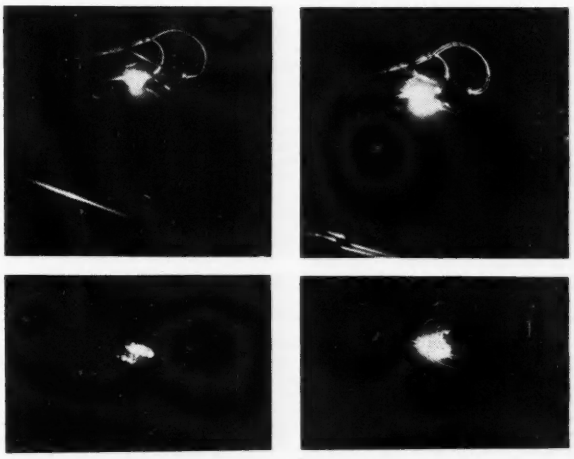
Switzerland.—Year's Output.—According to the bulletin of the Swiss Association of Electrical Engineers the output of electric power in Switzerland during the year ended September, 1939, amounted to approximately 7,176 million kWh, an increase of 122 million kWh (1.7 per cent.) over the preceding year. Hydro-electric plants were responsible for 7,089 million kWh, or 98.8 per cent. of the total production

TRANSPORT

Glasgow.—Tramway Extension.—Approval has been received by the Corporation to the construction of a tramway in Great Western Road from Knightswood Cross to the city boundary, a distance of 1½ miles. This and other improvements are to be carried out at a cost of £450,000, subject to Treasury approval. It is stated that more trams are in service and that more will be needed if the war continues over a long period.

Netherlands.—Railway Electrification.—The Netherlands Railways will continue previous plans for further electrification of its lines, according to Press reports. The routes involved are stated to be Amsterdam-Amersfoort, Hilversum-Utrecht and Amersfoort-Utrecht, and are to be completed during 1941, when the western sections of the railway system will have been largely electrified. At present, the Arnhem-Nijmegen line is being electrified and the work will be completed shortly.

South Shields.—Reducing Flashes from Overhead Equipment.—A substantial reduction in the flashes from tram and trolley-bus overhead equipment at circuit-breakers and crossings has been achieved by means of a device tried out by Mr. H. J. Troughton, general manager of the Transport Department. At the normal circuit-breaker which divides up the overhead equipment into half-mile sections an insulated bar is inserted of such a section as to allow the trolley wheel to run



The upper photographs illustrate flashes on overhead equipment with light and heavy current, respectively, and those below show the reduction effected by fitting the device tried out at South Shields

normally. The device consists of a portion of this bar being replaced by a series of metal contacts. Resistances are connected between each of the contacts and across the first and last is a condenser. Thus if the driver happens to leave the current switched on when passing under a circuit-breaker, instead of breaking the whole of the current when going from conductor to insulator the break is made gradually by reason of the resistances. Tests have been carried out with an experimental device of this type made by the Anti-Attrition Metal Co., of London. From the photographic results and also from visual inspection the reduction in the flash is shown to be very appreciable and warrants further experiments in adjusting the resistances and the capacity of the condenser, which will probably give better results still. The device can be quite easily fitted to crossings where a similar break in the overhead takes place and where at times excessive flashes occur due to the fact that a driver may be stopped at a crossing and then proceed with a heavy current.

Telephony in the United States

It is revealed in the annual report of the American Telephone and Telegraph Co. that during 1939 775,000 more telephones were connected to the Bell system compared with increases of 430,000 in 1938 and 876,000 in 1937. At the end of the year there were 16,536,000 telephones in service—a record number. There were also 5.6 per cent. more local conversations and 5.5 per cent. more toll and long distance conversations than in 1938. Including 4,200,000 telephones of connecting telephone companies and rural lines there were at the end of 1939 about 20,750,000 telephones in the United States, equal to 15.9 per 100 people, which was slightly lower than the previous highest average of 16.4 in 1930. The Bell system's gross operating revenue was $1,107,188,000, an increase of $54,530,000 over 1938, and the most in the history of the system. The total net income of the system applicable to American Telephone and Telegraph Co. stock was $190,281,000, an increase of $34,738,000 over 1938. The Company earned $9.24 per share in 1939, as compared with $8.16 per share in 1938.

NEW PATENTS

Electrical Specifications Recently Published

Compiled by a firm of chartered patent agents. The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1938

17490. "Electric - discharge lamps." General Electric Co., Ltd., J. N. Bowtell and H. G. Jenkins. June 13th, 1938. (Addition to 495706.) (519157.)

23947. "X-ray device." J. Kieffer. August 13, 1938. (519166.)

26582. "Cathode-ray tube apparatus." K. Tihany. September 13th, 1937. (519168.)

26830. "Light projectors." General Electric Co., Ltd., and G. S. Barrett. September 14th, 1938. (519177.)

27036. "Screening caps for sparking plugs." R. Bosch Ges. September 20th, 1937. (519188.)

27070. "Electric apparatus for timing the period of energisation of a given device." Igranic Electric Co., Ltd. (Cutler-Hammer, Inc.) September 16th, 1938. (519192.)

27083. "Refrigerators." Standard Telephones & Cables, Ltd., L. W. Reinken and J. S. Jammer. September 16th, 1938. (519194.)

27084. "Thermionic valves." Standard Telephones & Cables, Ltd., and A. I. Vangeen. September 16th, 1938. (519195.)

27085. "Printing telegraph apparatus." Creed & Co., Ltd., and R. D. Salmon. September 16th, 1938. (519196.)

27157. "Washing machines with electrical heating devices." Patentverwertungs-Ges. Hermes. September 17th, 1937. (Cognate application 27158/38.) (519205.)

27182. "Electrical signalling systems." Automatic Telephone & Electric Co., Ltd., E. W. Jones and E. B. Ireland. September 17th, 1938. (519211.)

27194. "Electric hot-plates with temperature regulators." Therma Electric Heating Manufacturing Co., Ltd. August 10th, 1938. (519213.)

27294/27295. "Circuit arrangements for starting and feeding electric discharge tubes Soc. Anon. pour les applications de l'Electricité et des Gaz Rares Etablissements Claude-Paz & Silva. August 9th, 1938. (519317/8.)

27388. "Electrical storage batteries, secondary cells or accumulators." J. R. Parkington. September 20th, 1938. (519324.)

27412. "Sheets or surfaces for use in electrochemical recording means whereby a trace is produced from which instantaneous values, as well as the rate of change of values, can be deduced." H. Hughes & Son, D. O. Sproule and A. J. Hughes. September 20th, 1938. (519328.)

27427. "Cathode-ray tube systems." Kolster-Brandes, Ltd., and W. A. Beatty. September 20th, 1938. (519330.)

27454. "Electric condensers." Dubilier Condenser Co. (1925), Ltd., and P. R. Coursey. September 20th, 1938. (519334.)

27463. "Magnetic speed-changers." J. T. Beechlyn and Walker & Co., Inc. September 20th, 1938. (519216.)

27467. "Firearms with electrical firing means." A. Gazda. July 5th, 1938. (519341.)

28765. "Ignition systems for internal combustion engines." H. E. W. West and A. Towle. October 4th, 1938. (519223.)

28799. "Photo-electric recording of variations in the chemical composition of a substance." Courtlands, Ltd., and R. S. Thomas. October 4th, 1938. (519229.)

28964. "Prepayment electricity meters." Chamberlain and Hookham, Ltd., and S. James. October 6th, 1938. (519234.)

28995. "Electric motor control systems." British Thomson-Houston Co., Ltd. October 8th, 1937. (519237.)

29018. "Control of electric-arc furnaces." Fides Ges. für die Verwaltung und Verwertung von Gewerblichen Schutzrechten. October 6th, 1937. (519238.)

29020. "Electric cables." C. J. Beaver, R. C. Leishman and W. T. Glover and Co., Ltd. October 6th, 1938. (519239.)

29043. "Thermionic-valve generators for diathermy and like purposes." E. K. Cole, Ltd., and E. Garthwaite. October 7th, 1938. (519240.)

29198. "Mounting of electric switches and other electrical units in wall boxes and the like." C. H. Parsons, Ltd., and G. B. Handley. October 8th, 1938. (Cognate application 30206/38.) (519251.)

29271. "Telephone systems." W. K. Brasher and B. F. Moss. October 10th, 1938. (519256.)

29293. "Electrical indicating and/or recording and/or controlling apparatus." Electroflo Meters Co., Ltd., and C. W. Couling. October 10th, 1938. (519269.)

29357. "Devices comprising an electric-discharge tube giving a visual indication of voltage." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. October 13th, 1937. (519263.)

29358. "Multi-carrier transmission systems." L. W. Meyer. (Naamlooze Vennootschap Philips' Gloeilampenfabrieken). October 10th, 1938. (519264.)

29500. "Prepayment mechanisms for gas and similar meters." J. B. Balmforth, G. A. Ormerod and Wilson Gas Meters, Ltd. October 12th, 1938. (519270.)

29607. "Electron-discharge tubes." Marconi's Wireless Telegraph Co., Ltd. October 19th, 1937. (519278.)

29764. "Snap-action electric switches." C. H. Parsons, Ltd., and G. B. Handley. October 14th, 1938. (519344.)

29823. "Metal-vapour rectifiers." General Electric Co., Ltd., and D. G. Prinz. October 14th, 1938. (519348.)

29830. "Resinous compositions." British Thomson-Houston Co., Ltd. October 16th, 1937. (519349.)

29838. "Directional-radio antenna arrays." Standard Telephones and Cables, Ltd. December 6th, 1937. (519350.)

29839. "Systems for indicating the direction of propagation of electro-magnetic waves." November 6th, 1937. (519351.)

29875. "Electric welding apparatus." H. G. Andre. October 16th, 1937. (Cognate application 29876/38.) (519353.)

29913. "Methods of hermetically sealing vitreous or ceramic vessels." British Thomson-Houston Co., Ltd., W. J. Scott and W. T. Cowhig. October 15th, 1938. (519355.)

1939

714. "Electrode for electric discharge tubes." Soc. Anon pour les Applications de l'Electricité et des Gaz Rares. Etablissements Claude-Paz. Silva. December 12th, 1938. (519362.)

8423. "Casings of pressed material, in particular artificial resin for measuring apparatus such as electrical measuring-appliances." Landis and Gyr Akt. Ges. April 5th, 1938. (519295.)

Hydro-electricity in Norway

THE total useful waterpower resources of Norway are estimated at 12 million kW, or almost half of all available hydro power in the United States. At the beginning of 1938 there were 2,715 plants containing 3,234 generators with a total rating of 1,948,470 kW, which has by now risen to more than 2.1 million kW.

Fuel import difficulties consequent on the present war will no doubt encourage fuller development of water power resources. Production and consumption of electric power is concentrated in a few regions. Over 55 per cent. of last year's output was used for industry, chiefly in electro-chemical and metal works, while in paper and pulp mills electric steam-raising is being provided to a growing extent. The biggest individual producer and consumer of electric energy is the chemical combine, Norsk Hydroelektrisk Kvelstof A/S, which owns and operates six water power plants aggregating 348,000 kW. Next comes the State, which owns stations at Norekraft (125,000 kW), Glamfjord (51,200 kW) and Morkfoss-Solbergfoss (90,000 kW), the latter jointly with Oslo municipality. Under a new five-year scheme, which contemplated the addition of five 25,000-kW sets at Norekraft, the State was to take the leading place with a total generator capacity of 391,000 kW. This project, including water storage, was to cost approximately £2,660,000, raising the capital invested in the Norekraft plant to £5,320,000.

Two-thirds of the present installed capacity is in thirty-six plants. Approximately 73 per cent. of the population is supplied with electricity at low rates that are remunerative to the producers, chiefly as a result of a pooling arrangement between the State, leading municipalities, power companies and industrial undertakings.

In the Ostland district of the country, which surrounds the capital within a radius of sixty miles, sixty hydro stations containing 900,000 kW, are linked up to serve 1.1 million people or three-tenths of the total population. Compared with Sweden, transmission distances are short, but the erection of new hydro stations transmitting 500,000 kW at 400 kV three-phase by two lines from South Norway *via* Denmark to North Germany have been envisaged, each line capable of carrying 250,000 kW. The distance from South Norway to Berlin is about the same as from the Lule River, North Sweden, to South Sweden, over which distance the Swedish Waterfalls Board planned to transmit power from a new 250,000-kW hydro station at Harspranget in the sub-arctic region of Norrland by means of a single 380-kV line.

Domestic consumption is growing rapidly, notably for cooking and house-heating, and during the past three years has risen from 4,208 to 4,535 million kWh. The sale of practically all domestic appliances in the past winter has broken previous records. Many boiler plants of centrally heated dwelling houses and schools were remodelled after the outbreak of war to utilise off-peak power, usually by adding electrode boilers to oil- or coal-burning plants with a view to saving imported fuel. Many water heaters or small electrodes boilers were also being installed in modern apartment houses whose hot-water systems are as a rule kept going throughout the summer.

FINANCIAL SECTION

New Companies. Returns of Capital. Debenture Charges. Bankruptcies and Liquidations. Reports of Electrical Companies. Dividend Announcements. Stocks and Shares

New Company Registered

K. M. Reflectors, Ltd.—Private company. Registered April 13th. Capital, £10,000. Objects: To acquire from Patrick King Morton an exclusive licence to make, use, exercise and vend industrial lighting reflectors known as "K.M. Reflectors.' and to carry on the business of manufacturers of and dealers in lighting devices, accessories and apparatus, &c. Subscribers: Miss S. N. Druitt, Danes Hill, Warren Park Road, Bengeo, Herts, and J. H. A. Long, Bengeo Hall, Hertford, solicitor. Solicitors: Trower, Still & Keeling, 5, New Square, W.C.

Companies' Returns

Statements of Capital

Electric & Musical Industries, Ltd.—Capital, £6,266,000 in 460,000 preference shares of £1 and 11,612,000 ordinary shares of 10s. Return dated December 20th, 1939. 460,000 preference and 5,805,749 ordinary shares taken up. £3 10s. paid on seven ordinary shares. £3,362,871 considered as paid on the remainder. Mortgages and charges, nil.

L.P.S. Electrical Co., Ltd.—Capital, £20,000 in £1 shares. Return dated December 8th, 1939. 15,000 shares taken up. £12,000 paid. £3,000 considered as paid. Mortgages and charges, £11,395 6s. 7d.

Wilts Wholesale Electrical Co., Ltd.—Capital, £2,000 in £1 shares. Return dated January 4th. All shares taken up. £466 paid. £1,534 considered as paid. Mortgages and charges, nil.

Synchronous Telegraphs, Ltd.—Capital, £5,000 in £1 shares. Return dated January 4th. 3,000 shares taken up. £100 paid. £2,900 considered as paid. Mortgages and charges, nil.

White, Jacoby and Co., Ltd.—Capital, £7,500 in £1 shares. Return dated January 11th. 5,794 shares taken up. £3,437 paid. £2,357 considered as paid. Mortgages and charges, £1,200.

Lucas Batteries, Ltd.—Capital, £20,000 in £1 shares. Return dated December 5th, 1939. All shares taken up. £20,000 paid. Mortgages and charges, nil.

Plessey Co., Ltd.—Capital, £500,000 in 250,000 5½ per cent. cumulative preference shares of £1 and 1,000,000 ordinary shares of 5s. All shares taken up. £264,050 5s. paid on 250,000 preference and 6,201 ordinary shares (including £12,500 premium on preference shares). £248,449 15s. considered as paid on 993,799 ordinary shares. Mortgages and charges, nil.

Faulkner & Co. (Manchester), Ltd.—Capital, £2,000 in £1 shares. Return dated December 28th, 1939. 1,900 shares taken up. £500 paid. £1,400 considered as paid. Mortgages and charges, nil.

Mortgages and Charges

E. Dyne & Co., Ltd.—Satisfaction to the extent of £1,200 on August 31st, 1939, of debentures authorised September 19th, 1933, and registered September 20th, 1933, securing £5,000. (Notice filed April 9th, 1940.)

Brush Electrical Engineering Co., Ltd.—Satisfaction to the extent of £2,160 on March 12th of 5¼ per cent. prior lien debenture stock authorised October 14th, 1938, and registered October 28th, 1938, securing £150,000.

Batterby & Hefford, Ltd.—Satisfaction in full on March 4th, 1940, of mortgage dated October 7th, 1935, and registered October 14th, 1935. (According to the register of mortgages, the mortgage registered October 14th, 1935, originally secured all moneys due to bank.)

Synchronome Co., Ltd.—Issue on March 20th, 1940, of £1,200 debentures, part of a series already registered.

Spicers (Electrical), Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated March 29th, 1940, to secure £1,000. Holder: R. J. Coley, Chapel Road, Hounslow.

Capital Increases

South Wales Relays (Pontypridd), Ltd.—The nominal capital has been increased by the addition of £1,000 in £1 ordinary shares beyond the registered capital of £5,000. The new shares were allotted at £1 premium on March 29th, 1940, to South Wales Relays, Ltd.

South Wales Relays (Bargoed), Ltd.—The nominal capital has been increased by the addition of £2,000, in £1 ordinary shares, beyond the registered capital of £7,500. The new shares were allotted at £1 premium on March 29th, 1940, to South Wales Relays, Ltd.

Receiver Released

E. T. Turner, Ltd.—H. J. Wheldon, of of 18, Broadway Chambers, W.6, ceased to act as receiver and/or manager on April 1st, 1940.

Private Arrangements

C. T. Clapham, electrical contractor, 4, York Place, Leeds, and 10, Branch Road, Lower Wortley, Leeds.—At a recent meeting of the creditors a statement of affairs was submitted showing liabilities of £660 all due to the trade. In addition there was a fully secured creditor for £60. The net assets were £448, leaving a deficiency of £212. The present position was attributed to losses which had been incurred. It was resolved that the estate should be dealt with under a deed of assignment to Mr. T. F. Wardale, of East Parade, Leeds, as trustee.

West End Radio Supplies, late Peglers Buildings, Gorseinon, near Swansea.—A meeting of creditors was held recently, when figures were submitted showing liabilities of £683 and assets estimated to realise £615, leaving a deficiency of £68. The creditors decided that the debtors should execute a deed of assignment in favour of Mr. L. S. Findlay, of Poppleton & Appleby, Windsor Place, Cardiff, as trustee, with a committee of inspection.

Meeting of Creditors

MacGregor & McCallum, Ltd.—A meeting of creditors is to be held to-day (Friday) at the offices of B. A. Woolf and Co., 31, Lombard Street, E.C.3.

Company Liquidations

Gallagher & Co. (Electricians), Ltd., 8 and 10, The Wicker, Sheffield.—The statutory meeting of creditors was held recently at the Law Society's Hall, Campo Lane, Sheffield, when Mr. J. Gallagher, one of the directors of the company, presided. It was reported that the company was formed in April, 1934, with a nominal capital of £1,000 which was increased to £5,000 in April, 1938. The issued capital was £3,740. According to a statement of the company's affairs at April 8th, 1940, the liabilities totalled £3,779, and the net assets were £1,483, leaving a deficiency, as regarded the creditors, of £2,295. A resolution was passed confirming the voluntary liquidation of the company with Mr. P. Cardwell, of Messrs. Poppleton & Appleby, Sheffield, as liquidator. A committee was also appointed.

Charlton Electrical Co., Ltd., electrical contractors, Empire House, St. Martin's-le-Grand, London, E.C.—The statutory meeting of creditors was held on April 9th at the above address, when it was reported that the ranking liabilities amounted to £7,320, all due to unsecured creditors. After allowing £233 for preferential claims the net assets were £1,473, leaving a deficiency of £5,847, so far as the creditors were concerned. The company was registered in August, 1933, with a nominal capital of £1,000. The whole of which was issued as the consideration for the transfer to the company of an existing business. The shareholders had nominated Mr. W. E. Rooke, accountant, as liquidator of the company. No resolution was passed by the creditors, but one supplier intimated that it was his intention to place a petition on the file for compulsory winding up.

A petition for the winding-up of the company was presented on April 10th by Brown Bros., Ltd., to the High Court and will be heard next Monday, April 22nd. Anyone desiring to appear must notify the solicitors for the petitioner, Reed & Reed, 1, Guildhall Chambers, Basinghall Street, London, E.C.2, by to-morrow (Saturday) morning.

Bloom's Radio, Ltd.—Meetings of members and creditors, pursuant to section 245 of the Companies Act, 1929, on May 10th at 35, Windsor Place, Cardiff to receive an account of the winding up by the liquidator, Mr. L. S. Findlay.

Magnus Volk, Ltd. Winding up voluntarily. Liquidator, Mr. F. V. Arnold.

Penarth Electric Lighting Co., Ltd.—Meeting May 15th at 88, Kingsway, London, W.C.2, to receive an account of the winding-up by the liquidators, Messrs. F. J. Cursons and T. H. Underhill.

Bankruptcy Proceedings

D. D. Rayner, engineer, 6, Wilson Street, Derby.—This debtor applied for his discharge recently at the Court House, 20, St. Peter's Churchyard, Derby. The Official Receiver said that the bankruptcy occurred in May, 1925, and the liabilities then totalled £784. The debtor was formerly employed as an electrical engineer, and in 1920 became associated with a limited company carrying on business as electrical engineers. In September, 1922, the debenture holders in the company appointed a receiver, with whom debtor worked for some time, but later terminated his appointment with the company. He then assisted in another engineering business at Derby which was started in his wife's name. A judgment had been obtained against him for £585 in respect of liability under a promissory note, and that judgment had caused his bankruptcy. He made an offer to pay £50 over three months for the benefit of his creditors, and the discharge was granted subject to a judgment for that amount.

R. S. Douthwaite, 156, Church Street, Whitby, wireless and electrical dealer.—The first meeting of creditors was held on April 9th at the Official Receiver's offices, Bank Chambers, Scarborough, when the statement of affairs showed gross liabilities of £221. Of that amount £188 was expected to rank for dividend, with net assets of £12, or a deficiency of £176. The debtor ascribed his failure to loss of business due to the outbreak of war. The case, being a summary one, was left in the hands of the Official Receiver as trustee.

E. A. V. Burton, electrical engineer, 14, St. Peter's Park Road, Broadstairs, Kent.—This debtor applied for his discharge recently at the Guildhall, Canterbury, Kent. The receiving order had been made in 1937, and the statement of affairs returned showed a deficiency of £600. A dividend of 6d. in the £ had been paid. Debtor said he would now consent to judgment for £20, and the discharge was granted on those terms.

W. Ellwood, 135, Suffolk Road, Southtown, Great Yarmouth, electrical engineer.—This debtor's public examination was held at the Town Hall, Great Yarmouth, on April 8th, and was closed. Debtor said the principal cause of his failure was illness. His ranking liabilities were £166, with a deficiency of £162.

S. B. Juster, radio and electrical dealer, 153, Shirley Road, Croydon, Surrey.—The public examination was recently held at the County Court, Scarbrook Road, Croydon. It was reported that the ranking liabilities amounted to

£334 and there was a similar deficiency. The examination was adjourned for closing.

R. A. Young, Gullet Passage, Shrewsbury, electrical and mechanical engineer.—The public examination was held on April 3rd at the Shire Hall, Shrewsbury, the debtor's statement of affairs showing liabilities of £333, with a deficiency of £308. The examination was closed.

A. E. Webster (Electric Supplies Co.), wholesale electrical fittings dealer, 37, Walbrook, London, E.C.—Receiving order made April 4th on debtor's own petition. Public examination May 28th, at Carey Street, W.C.2.

F. Ll. Bollen, radio and electrical engineer, Piddletrenthide, Dorset.—First and final dividend of 5s. 6d. in the £, payable April 17th at 12, Rolleston Street, Salisbury.

T. P. Rawson, wireless dealer, 56, Princes Avenue, Hull.—Receiving order made April 4th on debtor's own petition.

H. Mitchell, electrical engineer, 59, Parcmaen Street, Carmarthen.—Public examination May 7th at the Guildhall, Carmarthen.

Reports and Dividends

Purchase of Dollar Securities.—The Treasury announces that a further Order has been made transferring to itself all holdings of certain securities registered under the Securities (Restrictions and Returns) Order, 1939, of August 26th, 1939. Owners of securities affected should forthwith deliver them, accompanied by the necessary documents, to the Bank of Enland, London, or to the Bank of Ireland, Belfast, for transmission to the Bank of England. It is requested that such delivery be made through a bank or stockbroker, who will have the necessary instructions. Payment will be made on April 29th provided that the securities have been received by the Bank of England not later than April 19th; payment for securities delivered thereafter will be made seven clear business days after the date of receipt of the relative documents. Among the securities affected (with the acquisition prices in parentheses) are the American Superpower Corporation $6 cumulative first preferred stock (£16 2s. 10d.); Buffalo, Niagara and Eastern Power Corporation $5 cumulative first preferred stock (£24 18s. 2d. ex. div.); Buffalo, Niagara and Eastern Power Corporation $1.60 cumulative preferred stock (£5 2s. 3d.); Central Power and Light Co. 7 per cent Cumulative Preferred stock (£27 4s., ex div.); Consolidated Cities Light, Power and Traction Co. first lien 5 per cent. gold bonds 1962 (£22 10s. 7d.); Consolidated Gas Electric Light and Power Co. of Baltimore common stock (£20 6s. 6d.); Continental Gas and Electric Corporation 7 per cent. cumulative prior preference stock (£23 2s. 3d.); Electric Auto-Lite Co. (Ohio) common stock (£9 19s. 7d.); Electric Power and Light Corporation 5 per cent. gold debentures, Series due 2030 (£20 15s.); General Electric Co. (N.Y.) common stock (£9 9s. 8d., ex div.); Georgia Power Co. $6 cumulative preferred stock (£24 8s. 3d.); Jersey Central Power and Light Co. 5½ per cent. cumulative preferred stock (£22 16s. 1d.); Mississippi Power and Light Co. $6 cumulative first preferred stock (£21 1s. 4d., ex div.); Ohio Edison Co. $7 cumulative preferred stock (£28 10s. 1d.); Otis Elevator Co. common stock (£3 17s. 6d); Pacific Gas and Electric Co. common stock (£8 9s. 10d., ex div.); Public Service Corporation of New Jersey 6 per cent. cumulative preferred stock (£31 5s. 10d., ex div.); Radio Corporation of America $3.50 cumulative convertible first preferred stock £16 17s. 1d.); United Carbon Co. (Del.) common stock (£15 18s. 6d.); Western Union Telegraph Co. capital stock (£5 16s. 6d.); and Worthington Pump and Machinery Corporation common stock (£4 14s. 3d.).

Pinchin, Johnson & Co., Ltd., held their annual meeting on Tuesday when Mr. Edward Robson (chairman) emphasised the enormous increases in cost of most of their raw materials and the absolute necessity for carrying reserve stocks of these which were not readily available in this country at short notice. The profit and loss account balance of £258,942, as compared with £179,880 was a highly satisfactory improvement bearing in mind the extraordinary conditions. With two exceptions (the French and German companies) foreign and overseas units had bettered their positions. Very rapid progress had been made in the commercial development of new materials. Generally speaking, all sections of their business had shown good increases, and there had been tremendously increased demand for articles essential to wartime production. Competition was still severe and in some cases quite uneconomic. Prospects for the immediate future were dependent entirely on the requirements of the Government services, industrial activity and export.

The Philco Radio & Television Corporation of Great Britain, Ltd.—Presiding at the annual meeting on Monday last Mr. L. D. Bennett, chairman, referring to the company's effort to diversify its business, said that radio was still an important feature and steady sales had been experienced. With regard to exports under the Government scheme, the trade mark "Philco" was licensed for the British Isles only, but they hoped to devise ways and means with the Philadelphia Storage Battery Co. of broadening the basis of their radio sales and set designs were being developed to serve the export as well as the home market. Their engineering shops had been greatly expanded and were still being enlarged and they had been entrusted with important contracts and sub-contracts. Miscellaneous business was also growing.

The N.V. Hollandsche Draad en Kabelfabriek, of Amsterdam, reports that the gross profit increased from 1,006,094 guilders in 1938 to 1,060,000 guilders in 1939, while the net profit, after setting aside a sum of 352,019 guilders for depreciation, advanced from 658,869 to 707,981 guilders. Out of the latter sum 190,000 guilders goes to the reserve fund, making this 440,000 guilders, and a dividend of 7½ per cent. is to be paid, the carry forward amounting to 18,079 guilders as against only 12,502 guilders brought in.

The Anglo-Portuguese Telephone Co., Ltd., held its annual meeting on April 12th, when Sir Alexander Roger, chairman, who presided, said that their stations had increased by 1,408, the total number at the end of the year being 52,506. Since 1927 their system had multiplied two and a half times and it was satisfactory to note that the calling rate per subscriber was being maintained at a good level. Sir Alexander pointed out the value and wide range of the field which Portugal and the Portuguese Empire offered to British exporters and said that good opportunities for reciprocal trade with Portugal undoubtedly existed and it was important that they should not be missed because of a too rigid adherence to procedure appropriate to more normal times. The company is paying a final ordinary dividend of 5 per cent., making 8 per cent. for the year (same), and a dividend of 8 per cent. for the year (same) on the "A" ordinary shares.

The General Electric Co. (U.S.A.) reports that orders during 1939 totalled $360,748,386, as compared with $252,176,223 for 1938, and net sales billed $304,680,270 (against $259,484,341). Costs and expenses totalled $258,126,983, and depreciation $13,893,184, leaving a net income of $32,660,103 ($19,561,248), to which is added interest and dividends, royalties, &c., of $8,810,299, making a total of $41,470,402. The net income, after providing for taxes, was $41,235,644 ($27,729,329), plus earned surplus brought in of $122,671,387. Of this, valuation of investments absorbs $708,059, and dividends on the common shares $40,305,054, leaving a surplus carried forward of $124,310,036.

The Wessex Electricity Co. reports that income from sales of electricity for 1939 was £1,069,145, to which is added rentals of meters, &c., making £1,089,785. The net revenue is £187,664, which with profit on sales of appliances, £24,540, and interest £5,751, makes £217,956. Loan and other interest requires £91,384, and contingencies £20,000. The final ordinary dividend is 3 per cent., making 4½ per cent. for the year (all of the ordinary shares are owned by Edmundsons Electricity Corporation), and a balance of £24,800 is carried forward.

Paignton Electric Light & Power Co., Ltd.—At the annual meeting last week Mr. Selwyn S. Grant, O.B.E. (chairman) reported a small increase in sales during 1939 despite a falling off during the last four months. They had not found it necessary, so far, to curtail their activities in the hire of cookers and other appliances. A decrease in expenses had resulted in improved profit. Their bulk supply agreement with Torquay Corporation had expired and he could not yet announce the terms of a new agreement. There had lately been an improvement in sales, but it would be inadvisable to assume that that upward trend would be continued. The 10 per cent. dividend was repeated.

The Wellingborough Electric Supply Co., Ltd., reports a profit for 1939, after providing for depreciation and tax, of £9,464, as compared with £7,633 for 1938, to which is added £4,978 brought in, making £14,443. Reserve receives £2,000, and it is proposed to pay a final dividend of 5 per cent., making 8 per cent. for the year (same). The balance carried forward is £8,144. Sales of electricity in 1939 totalled 7.5 million kWh, as against 6.6 million kWh in 1938.

The Western Union Telegraph Co. reports a gross revenue of $95,660,403 for 1939, as against $91,712,401 in the preceding year. After providing $11,670,116 for repairs, $8,269,999 for depreciation, $4,468,724 for taxes and other employees' benefits and $3,741,000 for other taxes, there was a net revenue of $4,032,304 ($1,031,493). Miscellaneous income raises this to $5,550,818 ($2,550,559). Interest takes $4,170,704, leaving a net income of $1,380,114 (deficit $1,637,879). The surplus carried forward is $75,741,790 $74,433,027).

The South Wales Electric Power Co. reports a net revenue of £120,261 for 1939 after allocating £130,000 to depreciation. For 1938 the figure was £114,639, £110,000 being charged to depreciation. A final dividend of 3½ per cent., making 5½ per cent. (same), is to be paid on the ordinary shares, £25,000 (nil) is placed to contingencies and £20,000 (£15,000) to amount written off costs of debenture issue, leaving £38.175 (£34,414) to be carried forward. Meeting: April 22nd.

The Ottawa Light, Heat & Power Co., Ltd.—A special meeting of shareholders was held at Ottawa this week for the purpose of authorising the elimination of the outstanding 17,000 shares of 5 per cent. cumulative redeemable preferred stock $100 par, and also to authorise the directors to issue securities of a par value of $1,800,000, ranking junior to existing bonds, for the purpose of providing funds for redemption of the preferred stock.

The Urban Electric Supply Co., Ltd., reports a net profit of £40,883 for 1939, as compared with £55,124 for the preceding year. General reserve receives £5,000 and the final ordinary dividend is 4 per cent., again making 8 per cent. for the year. The balance carried forward is £53,280 (against £52,397 brought in).

The Société Financière de Transports et d'Entreprises Industrielles (Sofina) reports a gross revenue of 154,749,202 Belgian fr. for 1939, as compared with 152,119,834 fr. for 1938, and a net profit of 64,559,204 fr. (against 104,474,094 fr.) including 11,324,094 fr. brought in. The ordinary dividend is 250 fr. net (against 440 fr. net).

The International Telephone and Telegraph (U.S.) Co. reports net earnings of $14,798,486 last year as compared with $17,762,889. Charges of subsidiary companies took $4,733.314 ($4,339,981) and the total interest amounted to $5,170,681 ($6,533,062). The net income excluding German and Polish subsidiaries was $4,893,491 ($6,889,846).

Heatrae, Ltd., report a net profit for 1939 of £7.893 to which is added £5,835 brought forward, making a balance of £13,728. From this the preference dividend takes £1,500 and a payment of an ordinary dividend of 12½ per cent., less tax, is recommended. A sum of £5,186 is carried forward.

The West London & Provincial Electric & General Trust reports a net profit for 1939, after providing for tax, of £14,039, as against £17,634 for the previous year. The final dividend is 4 per cent., making 6 per cent. for the year (same).

Edmundsons Electricity Corporation, Ltd., reports that the results of the operations of its group of companies

(*Continued on page 469*)

STOCKS AND SHARES

Tuesday Evening.

STOCK EXCHANGE markets present a steady front to the various factors making for uncertainty and caution. The forthcoming Budget is the principal cause for the quietude that prevails in most departments. It is expected to clarify the position of E.P.T., and thus to pave the way for a better understanding than can be gained at present as to the manner in which the tax will be applied. The Treasury has announced a further long list of American securities that are now requisitioned by the Government. The payment for these will run into millions of pounds, some of which is certain to seek reinvestment in the Stock Exchange. The general tendency is accordingly firm, despite the lack of business. Small falls that occurred in prices last week have been in many cases recovered. A fall of £7 in Great Northern Telegraphs is the result of Germany's invasion of Denmark.

The Budget

With less than a week to run before the Budget, attention becomes increasingly occupied with the width of the gap between the prospective wartime expenditure of the nation, and the amount of revenue which, on the present basis of taxation, goes towards it. This would be reason enough in itself to account for the slow-down of Stock Exchange business, without the extra distraction of the Scandinavian developments. Fortunately, no illusions are entertained about the size of the Chancellor's problem, or about the way in which it should be met. Expectation is braced to meet the appearance of new and higher taxes, rather than to see the gap bridged altogether by the expedient of borrowing, with its dangers of inflation. It is safe to say that markets will feel better when the prescription is known, and the medicine digested. Until then, it is not so much the idea of more taxation as the unknown points of its chief impact that restricts market enterprise.

Electricity Supply

Electric Supply Corporation shares, at 46s. 3d., are 2s. 3d. up on the week, in somewhat tardy recognition of the satisfactory figures shown in the report. In lowering the dividend by a fraction, to 11½ per cent., the Company has done better than most people had expected. Edmundson's shares are slightly lower at 25s., having derived little benefit from the progressive showing of the Shropshire, Worcestershire and Staffordshire Electric report. Edmundson's hold the bulk of the ordinary capital of the "Three Counties" undertaking. Another member of the group is the Wessex Electricity Company, whose results are also now available. Other shares in this market have been marked down here and there, generally by something less than a shilling.

Debenture Stocks

Events of the past week have succeeded in shaking out but small additions to the scanty supply of well-secured debenture and preference stocks. Such fresh stock as comes to the electricity supply market appears at prices which underline the gilt-edged character with which the debentures are credited. For example, the buyer of North Eastern Electric 3½ per cent. debenture is asked to pay the same price as he would for the 3½ per cent. War Loan; that is, about a point under par. The debenture stock, however, provides the investor with a fixed and final date for its redemption—in 1964—whereas the 3½ per cent. War Loan is redeemable only at the Government's option at any time after 1952. On "dated" Government stocks the average return is about 3 per cent. The difference of some 10s. per cent. between yields on "dated" stocks and those stocks without definite redemption terms, can be regarded as the premium which investment is willing to pay for the assurance of having the capital returned intact after a given time. County of London 3¼ per cent. debenture stock, redeemable 1952-72, is on offer at 91½, to yield £3 11s. per cent., or £3 14s. per cent. allowing for the profit on redemption at the later date.

Equipment and Manufacturing Shares

The present strength of Telegraph Construction shares is the more noticeable because of the subdued condition of other electrical equipment shares, and, indeed, of the industrial markets as a whole. At 37s. 6d., the quotation is 5s. higher than it was earlier this year, although the equivalents of the final dividend and the scrip bonus have since been deducted. These shares, together with those of Johnson & Phillips, have been monopolising much of the current interest in electrical investments, the former on account of the report already published, the latter in anticipation of the results due shortly. Elsewhere in the same market, Switchgear and Cowans have recovered to 10s. on further consideration of the review of affairs given at the meeting. Otherwise, price movements have generally been against holders, although few in number and moderate in extent. Among the more material changes is the fall of a florin, to 31s. 3d., in English Electrics. Allen Wests, at 5s. 6d. xd., have been on the dull side since publication of the accounts.

Ever Ready

From the increased profits and dividend just declared by Ever Ready Trust, there is a disposition to draw hopeful inferences in connection with the Ever Ready (Great Britain) Company's dividend, due within a few weeks. The Trust has a well-mixed portfolio of investments, which include a substantial interest in the battery manufacturers. Ever Ready's financial year ended in March, so that the accounts will cover seven months of black-out conditions. Before last year's reduction of the dividend to 30 per cent., an annual distribution of 35 per cent. had become almost an established practice; in 1937 a further 10 per cent. was paid in the shape of a cash bonus. Incidentally, the excellent profits made from 1935 to 1937, when earnings were equal to an average of over 50 per cent. on the ordinary capital, appear to rob E.P.T. of any serious terrors. Hopes are expressed of a restoration of the dividend to 35 per cent. The Trust's ordinary shares have lately changed hands at around 23s., which gives a return of 7¾ per cent. on the 9 per cent. dividend—the highest payment for many years.

Radio

A certain amount of interest stirs, now and then, among the shares of the leading manufacturers of radio equipment. E. K. Coles, for instance, have picked up in the past week from 3s. 6d. to 4s. Electric and Musical Industries, now 8s. 9d. are also a little harder. Pye deferred remain at 8s. 6d. A. C. Cossors change hands occasionally at around 3s. 9d. Ordinary business in the radio field is generally supposed to be, for the time being, no more than a shadow of the normal, although the rise to popularity of the small portable sets—particularly those operated by batteries—is not overlooked. For "the duration," however, the assumption is that the chief employment of the companies' equipment—which is well suited to the production of the delicate electrical instruments required in modern warware—will be on Government account, and may be on a big scale. How matters will work out in terms of profits and dividends is a question for speculation. But the fact that the market in the shares retains a certain following suggests that some people expect them to pay satisfactorily for their keep if purchased at to-day's prices. The latter in some cases represent a small fraction of the quotations ruling in normal times.

Overseas Companies

After a reaction to 11⅝ in Brazilian Traction shares the price rallied again to 12. Hopes that a relaxation of Brazilian exchange restrictions will enable the Company to remit funds here for a dividend payment continue to be expressed. Supporters of the shares are still talking the price to higher levels. Anglo-Argentine Tramway issues remain in a somewhat friendless state. Among the Indian electricity supply issues, Calcuttas have eased further to 35s. The Palestine companies' shares remain steady. East African Power strengthened to 25s. Tokyo Electric "sixes" have given way to the extent of a point, to 66½, but have been fairly well sustained, on balance, in recent weeks. Whitehall Electric 7½ per cent. preference are back to 16s., following the recovery to about 17s. 9d. which took place on the decision to pay the full year's dividend. American markets have made one or two starts towards revival. A number of prices are appreciably better, American "Tel. & Tel." for instance, having put on 5½ points, to 215½, in the past fortnight.

Great Northern Telegraph

The Great Northern Telegraph Company is a Danish undertaking, with its head office in Copenhagen. For years the company paid an annual dividend of 20 per cent. on its shares. Rumour has found credence in the report that the Danish Royal family has a large interest in the company's shares. Its lines run to the far North East, as well as to many European countries. Its investments include well over a million pounds in British Government stocks. The price of the shares reached 39 last year. On Monday in this week, shares changed hands at 10, and to-day, Tuesday, business was recorded at 10½ and at 11. What effect the German invasion of Denmark will have upon the Company is, of course, a matter of utter uncertainty. The year ends with December. An interim dividend of 5 per cent. was paid last October. Declaration of the final dividend—ordinarily 15 per cent.—is due about the end of the present month.

Miscellaneous Matters

In the gilt-edged market, prices have moved irregularly, but on balance have given a good account of themselves. Spells of weakness have occurred—one Government stock momentarily touched the newly drawn-up level of minimum prices—but the powers of recovery have been quick to assert themselves on any setback. Among Central Electricity and London Transport Board stocks the only quotable change is the fall of a point in the latter's 5 per cent. "B" issue, now 109½. London Transport "C" stock, at 45, shows a small loss which is in keeping with the undecided behaviour of the junior Home Railway stocks. Sentiment in this market has blown hot and cold owing to a division of attention between, on the one hand, new wage claims by the employees, and, on the other, the prospect of an increase in transport charges. According to the terms of the Government compensation scheme for the railways in wartime, higher charges will be allowed against increased expenses. With the dividend announcement imminent, Cable and Wireless ordinary stock shows a point gain at 62½, but the 5½ per cent. preference, at 95 continues somewhat unaccountably dull. Globe Telegraph and Trust preference gave way to 27s. 6d.

ELECTRICAL COMPANIES' SHARES

Prices, Dividends and Yields

Company	1940 High-est	1940 Low-est	Dividend Pre-vious	Dividend Last	Price April 16	Rise or Fall	Yield p.c. £ s. d.
Home Electricity Companies							
Bournemouth and Poole ...	63/6	57/–	15	15	62/6	—	4 16 0
British Power and Light ...	30/–	25/3	7	7	28/–	—	5 0 0
City of London	28/–	26/–	7½	7½	25/6	–6d.	5 17 8
Clyde Valley	38/6	33/–	8	8	37/–	—	4 6 5
County of London... ...	43/3	34/6	10½	10½	36/3	–9d.	5 16 0
Edmundson's :							
7% Pref....	31/6	28/–	7	7	31/3	—	4 9 7
Ord.	27/6	21/9	9	6	25/–	–6d.	4 16 0
Elec. Dis. Yorkshire ...	40/3	35/9	9	9	38/9	—	4 16 0
Elec. Fin. and Securities ...	41/–	40/–	12½	12½	40/–	—	6 5 0
Elec. Supply Corporation...	45/9	41/–	12	11½	46/3	+2/3	4 19 7
Isle of Thanet	16/–	15/–	4	4	15/–	—	5 6 8
Lancs Light and Power ...	33/–	28/6	7½	7½	31/3	–9d.	4 16 0
Llanelly Elec.	21/–	19/6	5½	5½	21/–	—	5 4 9
Lond. Assoc. Electric ...	21/–	18/9	7	5½	18/9	–9d.	5 17 4
London Electric	37/6	26/3	8	7½	27/–	—	5 7 8
London Power Deb. Red....	105½	103	5	5	104½	—	4 15 6
Metropolitan	41/6	36/–	12	10	36/3	—	5 10 4
Midland Counties	39/–	32/9	8	8	36/3	–9d.	4 8 6
Mid. Elec. Power	40/–	36/–	8	9	38/9	—	4 13 0
Newcastle Elec.	29/9	26/–	7	7	27/6	–1/6	5 1 10
North Eastern Electric :							
Ordinary...	31/6	26/6	7	7	29/–	—	4 16 7
7% Pref....	32/6	30/–	7	7	31/6	—	4 9 0
Northampton	48/–	41/–	10	10	42/6	—	4 15 0
Notting Hill 6% Pref. (£10)	10⅜	10	6	6	10⅜	—	—
Northmet Power :							
Ordinary...	42/3	35/6	10	10	37/–	–6d.	5 8 1
6% Pref....	29/–	26/9	6	6	28/–xd.	—	4 5 9
Richmond Elec.	24/6	22/9	7	6	23/9	—	5 1 1
Scottish Power	38/–	31/9	8	8	35/9	–6d.	4 9 6
Southern Areas	21/3	18/6	5	5	20/6	—	4 17 7
South London	23/3	22/–	7	7	22/6	—	6 4 3
West Devon	30/–	18/9	5	5	18/9	—	5 6 8
West Glos.	21/3	16/6	2	2½	21/3	—	2 10 0
Yorkshire Elec.	40/–	33/3	8	8	38/9	—	4 2 5
Overseas Electricity Companies							
Atlas Elec....	4/–	2/6	Nil	Nil	3/3	—	—
Calcutta Elec.	37/–	30/–	10*	10*	35/–	–6d.	—
Cawnpore Elec.	30/–	28/6	10	10	28/9	—	—
East African Power ...	24/9	23/3	7	7	25/–	+6d.	5 12 0
Jerusalem Elec.	24/–	21/6	7	7	24/–	—	5 16 8
Kalgoorlie (10/–)	12/6	9/6	7½	7	12/6	—	5 12 0
Madras	26/9	26/–	8*	8*	26/3	—	—
Montreal Power	35½	31	1½	1½	34	—	—
Palestine Elec. " A " ...	25/–	23/–	7½*	5*	25/–	—	4 0 0
Perak Hydro-electric ...	20/3	17/3	6	2½	17/6	—	2 17 4
Shawinigan Power ...	27¼	20	83cts.	90cts.	25	+½	—
Tokyo Elec. 6%	69	59½	6	6	66½	–1	9 0 6
Victoria Falls Power ...	75/9	67/9	12½	15	74/6	—	4 0 6
Whitehall Investments Pref.	17/9	12/6	7½	7½	16/–	–6d.	9 7 6
Public Boards							
Central Electricity :							
1950–70	110½	107	5	5	109	—	4 11 7
1955–75	112¼	108½	5	5	111	—	4 10 0
1951–73	107½	103	4½	4½	107	—	4 4 0
1963–93	96½	90	3½	3½	95½	—	3 13 8
London Elec. Trans Gtd....	92	87½	2½	2½	91	—	2 15 0
London & Home Counties							
1955–75	113¼	106½	4½	4½	106½	—	4 4 6
Lond. Passenger Transport							
A	116	104	4½	4½	109½	—	4 2 2
B	116	103	5	5	109½	–1	4 11 4
C	65½	42¾	1½	—	45	–½	—
West Midland Joint Elec.,							
1948–68	106½	105	5	5	106½	—	4 14 0
Telegraph and Telephone							
American Tel. & Tel. ...	215	205	9	9	215	+2½	4 3 8
Anglo-Am. Tel. :							
Pref.	100½	93½	6	6	99½	—	6 0 7
Def.	23⅜	21	1½	1½	22	—	6 16 4
Anglo-Portuguese	22/3	19/9	8	8	22/–xd.	—	7 5 6
Cable & Wireless :							
5½% Pref.	99⅜	94	4½	5½	95	–½	5 15 9
Ord.	65	56	4	4	62½	+1	6 8 0
Income	90½	93	—	—	90½	—	4 0 5
Canadian Marconi $1 ...	6/–	4/6	Nil	4cts.	5/6	—	—
Globe Tel. & Tel.							
Ord.	32/3	28/6	7½*	7½*	32/6	—	4 12 4
Pref.	28/9	24/6	6	6	27/6	–⅛	4 7 3
Great Northern Tel. (£10)...	20	12	20	20	12½	–7	16 0 0
Inter. Tel. & Tel.	5½	4½	Nil	Nil	5	—	—
Marconi-Marine	30/–	26/3	7½	10	28/9	—	6 19 4
Oriental Telephone Ord. ...	2⅞	56/–	12*	12*	2⅞	—	4 5 5
Telephone Props.	14/–	13/3	5	6	15/–	—	8 14 6
Telephone Rentals (5/–) ...	9/6	7/6	10	10	9/–	—	5 11 3
Western Union	34	28	2¾	—	30½	—	—
Traction and Transport							
Anglo-Arg. Trams :							
First Pref. (£5)	4/3	3/3	Nil	Nil	4/–	—	—
4% Inc.	11	7½	Nil	Nil	11½	—	—
British Electric Traction :							
Def. Ord.	830	629	5	5	745	–5	—
Pref. Ord.	169	147	8	8	165	—	4 17 0
Bristol Trams	48/6	42/–	10	8*	48/3	—	3 6 6
Brazil Traction	12½	9½	$1	50c.	12	—	—
Calcutta Trams	24/–	22/6	8	8	23/6	—	6 16 2
Cape Elec. Trams	17/–	16/–	5	5	16/6	—	6 1 3
Lancs Transport	35/–	28/3	10	10	35/–	—	5 14 8
Mexican Light :							
1st Bonds	33	28	5	5	30½	—	—
Rio 5% Bonds	90	74	5	5	90	—	5 11 1
Southern Rly. :							
5% Prefd.	79	64	5	5	70	—	7 2 10
5% Pref....	104½	89¾	5	5	98½	–2	5 1 6
T. Tilling	45/9	36/9	10	10	42/–	—	4 15 3
Tilling & B.A.	47/6	43/9	9*	8*	47/6	—	3 7 10
West Riding	35/–	28/6	10	10	33/–	–6d.	6 1 3
Equipment and Manufacturing							
Aron Electricity Ord. ...	17/6	15/0	15	15	17/6	—	—
Assoc. Elec. :							
Ord.	43/3	37/9	10	10	40/–	+6d.	5 0 0
Pref.	35/3	32/3	8	8	35/–	—	4 11 5
Automatic Telephone & El.	47/3	42/–	12½	12½	43/9	–⅛	5 14 1
Babcock & Wilcox	50/–	42/–	10	12½	46/3	+⅛	5 8 3
British Aluminium Ord. ...	56/–	48/3	12½	12½	53/9	—	4 13 0
British Insulated Ord. ...	92/6	78/9	20	20	86/3	—	4 12 10
British Thermostat (5/–) ...	14/9	11/9	18½	18½	13/3	—	6 19 7
British Vacuum Cleaner (5/-)	12/6	8/6	40	12½	12/6	—	5 0 0
Brush Ord....	4/6	3/–	Nil	Nil	4/6	—	—
Callender's	69/–	59/6	20	15	63/9	–¼	4 14 4
Chloride Elec. Storage ...	72/6	68/–	20	15	3½	—	4 5 9
Consolidated Signal ...	68/–	59/–	36½	17	3½	—	5 4 7
Crabtree (10/–)	24/9	21/–	17½	17½	23/9	—	7 7 4
Crompton Parkinson :							
Ord. (5/–)	20/–	17/–	15	20	18/9	—	5 6 8
E. K. Cole (5/–)	5/–	3/3	10	Nil	4/–	+6	—
Elec. & Musical Industries							
(10/–)	10/3	7/9	5	Nil	8/9	+3d.	—
Electric Construction ...	35/9	32/6	12½	13¾	36/3	+¼	7 9 2
Enfield Cable Ord. ...	56/–	46/3	25	16½	53/9	—	6 0 10
Electrical Switchgear (10/–)	22/6	20/–	16	10	21/3	—	4 14 3
English Electric	33/9	29/6	10	10	31/3	–2/–	6 8 0
Ensign Lamps (5/–) ...	15/3	13/9	25	25	13/9	—	9 1 10
Ericsson Tel. (5/–) ...	39/3	33/9	25*	25*	36/3	—	3 9 0
Ever Ready (5/–)	27/6	26/–	35	30	26/6	—	5 13 2
Falk Stadelmann	18/3	17/6	10	6	17/6	—	6 17 4
Ferranti Pref.	24/9	23/–	7	7	23/9	—	5 18 0
G.E.C. :							
Pref.	32/6	28/–	6½	6½	32/–	—	4 1 3
Ord.	83/3	74/3	17½	20	80/–	—	5 0 0
Greenwood & Batley ...	25/6	16/–	15	10	25/–	—	12 0 0
Hall Telephone (10/–) ...	18/6	18/–	15	10	16/3	—	6 3 1
Henley's (5/–)	21/6	17/9	20	20	20/–	–9d.	5 0 0
4½% Pref.	21/3	20/6	4½	4½	21/3	—	4 4 8
Hopkinsons	46/9	42/6	12½	15	45/–	—	6 13 4
India-Rubber Pref. ...	21/–	20/3	5½	5½	20/9	—	5 6 0
Intl. Combustion	121/3	110/–	32½	32½	5⅝	–½	5 14 10
J. Lucas	60/6	53/3	15	15	57/6	—	5 4 5
Johnson & Phillips ...	50/6	42/3	12½	12½	50/–	—	5 0 0
Lancashire Dynamo ...	59/9	53/–	25	20	55/–	—	7 5 6
Laurence Scott (5/–) ...	11/–	9/3	15	15	10/6xd	—	6 16 4
London Elec. Wire ...	25/6	25/–	12	7½	25/–	—	6 0 0
Mather & Platt	46/6	36/3	13½	10	40/9	–6d.	4 18 0
Metropolitan Elec. Cable Pf.	22/–	21/3	5½	5½	21/3	—	5 3 6
Murex	86/9	77/6	20	20	83/9	+½	4 15 6
Pye Deferred (5/–) ...	7/6	7/–	25	25	8/6	—	15 12 6
Revo (10/–)	20/9	17/6	17½	17½	17/6	—	10 0 0
Reyrolle	60/6	56/3	12½	12½	57/6	—	4 7 0
Siemens Ord.	23/9	19/6	7½	7½	23/9	—	6 6 4
Strand Elec. (5/–) ...	2/3	1/9	10	4	2/–	—	8 0 0
S. Smith (1/–)	8/–	7/–	37½	50	7/6	—	6 13 4
Switchgear & Cowans (5/–)	11/9	7/6	20	10	10/–	+6d.	5 5 3
Telegraph Condenser (10/–)	8/9	6/3	5	—	8/9	—	—
Telegraph Construction ...	42/6	32/6	10	10	37/6	+⅛	5 6 8
Telephone Mfg. (5/–) ...	9/–	7/9	9	9	9/–	—	5 0 0
Tube Investments... ...	96/9	87/9	23¾	23¾	92/6	—	5 4 6
Vactric (5/–)	3/6	2/–	4	Nil	3/6	—	—
Vickers (10/–)	22/–	16/6	10	10	18/–	+6d.	5 11 0
Ward & Goldstone (5/–) ...	19/9	19/3	20	20	19/9	—	5 1 3
Westinghouse Brake ...	46/–	32/9	17½	10	42/6	–⅛	4 14 1
Walsall Conduits (4/–) ...	26/6	23/9	55	55	26/3	—	8 7 8
West, Allen (5/–)	7/–	5/–	10	7½	5/6	—	5 15 5

* Dividends are paid free of Income Tax.

CONTRACT INFORMATION

Particulars of work for which tenders are invited, contracts placed, and building schemes promising work for electrical contractors and traders

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses. Further details of items marked with an asterisk can be obtained from the Department of Overseas Trade (Inquiry Room), Great George Street, London, S.W.1.

Aberdeen.—April 24th. Town Council. Supplies to Services Department for three months, including electrical fittings. City engineer's office.

Abingdon.—April 25th. Joint Hospital Board. Electric wiring and equipment at the Isolation Hospital (Blocks 1 and 3). A. B. West, architect to the Board, 9, Bridge Street.

Argentina. — BUENOS AIRES.—April 30th. National Sanitation Works Department. Eight electric centrifugal pumps and accessories. (T. 18204/40.)*

Australia. — MELBOURNE.—May 7th. Posts and Telegraphs Department. Measuring and testing instruments, including insulation and resistance testers. (T. 17068/40.)*

BRISBANE.—May 10th. City Council. 11-kV three-phase metal-clad switchgear. (T.Y. 18200/40.)*

Birmingham. — May 10th. Electric Supply Department. Cable jointing compound for the year ending June 30th, 1941. (April 5th.)

Burnley.—April 29th. Electricity Department. E.h.v. switchgear, transformers and e.h.v. cables. (See this issue.)

Colchester.—April 22nd. Electricity Supply Department. Electrical installation in new meter and installation department premises. Tenders restricted to contractors within the Department's area of supply. Electrical engineer, Electricity Offices, 36, Osborne Street, Colchester.

Edinburgh.—April 19th. Town Council. Installation of electric lighting in thirty-five houses and electric lighting and power in five shops at West Pilton housing area (third development). Engineer's office, Dewar Place (deposit £1 1s.).

Gravesend.—May 4th. Electricity Supply Department. Extra-high-voltage switchgear. (See this issue.)

Guernsey.—April 30th. States Water Board. Pumping machinery at the St. Saviour's works, comprising four installations of electrically driven centrifugal pumps, with control gear and cables, a Diesel-engine-driven 180-kW alternator and two air blowers. T. & C. Hawksley, 34, Old Queen Street, London, S.W.1 (deposit £3 3s.).

Hastings.—May 27th. Electricity Department. Boiler fuel for period July 1st, 1940, to June 30th, 1941. (See this issue.)

Heston and Isleworth.—May 3rd. Town Council. Two electrically propelled 7 cu. yd. refuse collection vehicles. O. P. F. Hilton, borough engineer, Council House, Hounslow.

London. — COMMISSIONERS OF H.M. WORKS.—April 26th. Installation of electric light and power services at H.M. Stationery Office, Harrow. (April 5th.)

Manchester.—April 19th. Electricity Committee. Kettles, meters, AC industrial motors and static transformers for one year. (April 5th.)

April 23rd. Public Health Committee. Refrigerating plant and cold chamber to the kitchen, Withington Hospital. City architect, Town Hall (deposit £1 1s.).

April 26th. One 50-kW mercury-arc rectifier equipment. (April 12th.)

May 3rd. Chlorination plant for circulating water at Barton power station. (April 12th.)

Morecambe and Heysham.—May 6th. Electricity Department. Two outdoor-type 6,000-kVA transformers with automatic on-load tap-changing gear. (See this issue.)

Middlesbrough.—April 30th. Hospitals Committee. Electric lighting and power installations in part of Hemlington Hospital. (See this issue.)

New Mills.—May 6th. Electricity Department. One 250-kVA transformer and 10-kV and 660-V cables. (See this issue.)

Portsmouth.—May 9th. Electricity Department. One 1,500-kVA automatic moving-coil voltage regulator. (See this issue.)

South Africa.—JOHANNESBURG. — May 6th. Railway and Harbours Administration. Two 15-ton electric wharf cranes with 4-ton auxiliary hoists for Durban Harbour. (T. 17439/40.)*

Eleven 4-ton level luffing electric portal travelling wharf cranes. (T. 17640/40.)*

May 15th. City Council. Electric lamps. (T.Y. 17896/40.)*

SALISBURY (SOUTHERN RHODESIA). — May 14th. Electricity Department. 11,000-V, 3,300-V and 460-V p.i. cables, v.i.r. cables and cable boxes, for the new power station, Western Commanage. (T. 17617/40.)*

CAPE TOWN.—May 15th. Electricity Department. Nine 10-kVA and six 25-kVA 3-phase pole mounting distribution transformers. (T. 17372/40.)*

May 1st. Cables. (T.Y. 17884.)*

DURBAN.—May 3rd. General Stores Department. Overhead line material and steel stay wire. (T. 17338/40.)*

PRETORIA.—May 2nd. Union Tender and Supplies Board. One 75-kVA alternator to be driven from an existing 100-kW DC generator. (T. 18256/40.)* Accumulators. (T. 18253/40.)*

Stoke-on-Trent.—May 8th. Electricity Department. Overhead transmission line. (April 12th.)

Todmorden.—April 27th. Borough Council. Filtration plant at the Shade School swimming bath. F. Tunnell, borough engineer, Municipal Offices (deposit £2 2s.).

Warrington.—May 6th. Electricity Department. Transformers. (April 12th.)

April 29th. Gas Department. Electrically operated, automatically controlled boosting plant. A. Cook, engineer, Gas Offices, Mersey Street.

West Hartlepool.—April 20th. Borough Council. One 5,000 kVA three-phase transformer, 20,000/5,760 V. (April 5th.)

West Midlands.—April 26th. J.E.A. 11-kV distribution switchgear for Oakengates switching station, Shropshire distribution area. (April 5th.)

Workington.—April 20th. Corporation. Two 750-kVA transformers. (April 12th.)

Wirral.—April 20th. Urban District Council. Supply and installation of a 3-in. horizontal non-chokeable pump and electric motor, for pumping crude sewage; surveyor, Council Offices, Heswall, Wirral.

Orders Placed

Blackpool.—Electricity Committee. Accepted. Three 300-kVA transformers.—Lindley Thompson Transformer Co. Switchboard.—Switchgear & Cowans.

Gas Committee. Accepted. Electric lighting, power and telephone installations at new gas works, Marton.—W. H. Smith & Co. (Elec. Engrs.), Ltd.

Falkirk.—Town Council. Accepted. 100-kW rectifier (£485).—Electric Construction Co.

Glasgow.—Transport Committee. Accepted. Stoneware conduits.—Albion Clay Co.; Doulton & Co. Transformers at Larfield Garage.—J. H. Scott.

Hendon.—Town Council. Accepted. Electric lighting work in connection with cleansing stations at Mill Hill and Hendon Way.—Knights (Hendon).

Eire.—CAVAN.—Board of Health. Accepted. Electrical installation at the new Tuberculosis Hospital, Farnham Road (£2,721).—Bective Electrical Co.

COMMISSIONERS OF PUBLIC WORKS.—Accepted. Electrical work at the Curragh Camp.—Hadens Engineering Co. Electrical work and three months' supplies, Dublin district.—Brooks, Thomas & Co.

London. — METROPOLITAN WATER BOARD.—Accepted. Electric lighting installation at new workshops, Brixton waterworks (£400).—Mortimer, Gall & Co.

Plymouth.—Electricity Committee. Accepted. Cable boxes for twelve months.—Callender's.

Portsmouth. — Electricity Committee. Accepted. Earthing resistance (£172).—Johnson & Phillips.

Prestwich. — Borough Council. Accepted. 300 modified street-lighting fittings to be installed on existing standards.—Revo Electric Co.

Scarborough. — Town Council. Accepted. Modifications to the 11-kV switchgear (£6,124).—English Electric Co. Automatic fire-fighting equipment at the generating station switch-house (£210).—Walter Kidde & Co.

Swansea.—Town Council. Accepted. Electric lighting and heating installations at Community Centre.—Magneto Repair and Winding Co.

Financial Section (*concluded from page 466*)

Reports and Dividends—continued

during March, as compared with the corresponding month of 1939, show an increase of 15 per cent. of kWh sold.

The Cornwall Electric Power Co. reports a net profit for 1939 of £18,464, as compared with £18,468 in 1938. The ordinary dividend for the year is 3 per cent. and £3,742 is carried forward (against £3,278 brought in).

Ransomes & Rapier, Ltd., announce a final dividend on the ordinary shares of 4 per cent. (against 5 per cent.), making 6½ per cent., tax free, for the year (against 7½ per cent.).

Herbert Morris, Ltd., have declared an interim dividend of 7½ per cent., tax free. This is at the same rate as last year, but is paid on capital increased by a 25 per cent. scrip bonus.

Aktiebolaget Elektrolux reports a net profit for 1939 of 3,430,000 kr. against 3,900,000 kr. for 1938. A reduction from 10 kr. to 5 kr. per 75 kr. share is to be made in the dividend.

The Kalgoorlie Electric Power & Lighting Corporation, Ltd., is paying a final dividend of 4½ per cent., making 7½ per cent. for the year (unchanged).

The English Electric Co. of Canada records a net profit in 1939 of $75,036 available for dividends on the class "A" stock.

Cable and Wireless, Ltd., announces a final dividend of 2½ per cent., making 4 per cent. for the year (against 3¼ per cent.).

Cable and Wireless (Holding), Ltd., is to pay a dividend of 4 per cent. (same) on the ordinary stock.

The Shanghai Electric Construction Co. is paying a first and final dividend of 5 per cent. (against 8 per cent.).

The Quebec Power Co. announces an interim dividend of 25 cents (same) for the quarter ended March 31st.

Veritys, Ltd., are to pay a first and final dividend of 6 per cent. as against 10 per cent. last year.

The Renold & Coventry Chain Co., Ltd., has announced an interim dividend of 3 per cent. (same).

The Brixham Gas & Electricity Co. is to pay a final dividend of 2½ per cent., making 5 per cent. (same).

The West Devon Electric Supply Co., Ltd., announces a first and final dividend of 5 per cent.

Murex, Ltd., has declared an interim ordinary dividend of 7½ per cent. (same).

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Bath.—Reconstruction work at Prior Park College; Mowbray, Green & Hollier, architects, Bath.

Batley.—Houses, Bradford Road, for J. Spedding and Sons, Ltd.

Birmingham.—New works for B.S.A. Tools, Ltd., Marston Green; Higgs & Hill, builders, Crown Works, South Lambeth Road, London, S.W.8.

Blackpool. — Houses at Crompton Avenue; T. Harrison, 6, Burgess Street.

Blackwell. — Rebuilding portion of Newton School, for Derbyshire E.C.; county architect, St. Mary's Gate, Derby.

Carlisle.—Inn at Stanwix; State Management Committee.

Chesterfield.—Additions to police headquarters, New Beetwell Street; Wilcockson & Cutts, architects, 12, Saltergate, Chesterfield.

Cleckheaton.—Health centre at Elm Bradford Road; J. Wallbank, surveyor, Town Hall.

Clowne.—Housing scheme, Creswell, for R.D.C.; surveyor, Council Offices.

Coventry.—Additions to the Coventry Radiator Works, Canley Gates, Canley; Gray & Son, builders, Coventry.

Erection of institution for the Public Assistance Committee; city architect, D. E. E. Gibson, 2a, Warwick Road, Coventry.

Additions to the works of the Coventry Gauge & Tool Co., Ltd., Fletchamstead Highway, Fletchamstead; Gray & Son, builders, Coventry.

Additions to the works of S.S. Cars, Ltd., Holbrook Lane; Gray & Son.

Dewsbury.—Extensions, Mill Street East; Mason Bros.

Extensions, 66, High Street; Tadcaster Tower Brewery Co.

Temple Road senior girls' school (£41,605), for E.C.; borough engineer.

Eire.—COUNTY CORK.—National school at Lismore, Co. Cork, for Commissioners of Public Works; G. P. Fagan, secretary, Office of Public Works, Dublin.

Glasgow.—Houses for Corporation; city architect.

Alterations and additions to property for A. & P. Steven, Ltd., 181, St. James Road; J. Baird and J. Thomson, architects, 150, Holland Street.

Extension to property in Blochairn Road for Steel Company of Scotland; Colville Constructional Co., Ltd., Glengarnock.

Motor showrooms at 616-620, Argyle Street; Wright & Kirkwood, architects, 26, Blythswood Square.

Halesowen.—Extensions to works; Walter Sommers, Ltd., Mucklow Hill.

Huntingdon. — Houses for R.D.C.; W. A. Lea, architect, 4, Market Hill, Huntingdon.

Jarrow-on-Tyne.—Offices and canteen block to be built at works of Jarrow Metal Industries; Bewley & Scott, Ltd., contractors, Dunston-on-Tyne.

Kilmarnock. — Canteen, compressor house, ambulance room, &c. (£5,400) for John Walker & Sons, Ltd.; the manager.

Lancashire. — Junior and infants' school, Whiston; county architect, County Offices, Preston.

Lichfield.—Works extensions; Tuke & Bell, Ltd.

Liverpool. — Parish hall (£5,000), Stapleton Avenue and Lovell Road, Speke Estate, for R.C. authorities.

Houses on Sparrow Hall estate; L. H. Keay, director of housing, Municipal Buildings, Dale Street, Liverpool.

Dispensary at Rainhill County Mental Hospital; Richard Owens & Son, architects, 3, Crosshall Street, Liverpool.

London.—SOUTHWARK.—Laundry building, 99-107, East Street; Andrews and Gale, Alexandra House, 135, Bow Road, E.3.

Manchester.—Extension to works, Ambergate Street and Forrest Street, Beswick; Roberts & Wood & Elder, architects, 26, King Street, Manchester.

Additions to dairy, Hastings Street, Chorlton-upon-Medlock, for Avondale Dairy Co.; H. A. Yearsley, architect, 7, Oxford Road.

Works adjoining Grosvenor Garage, Burnage Lane, Levenshulme, for A. Freeman, Burnage Lane; W. C. Coulson, architect, 29, Westholme Road, Withington.

Extensions, T. French & Sons, Chester Road Mills; H. S. Fairhurst & Son, architects, 55, Brown Street.

Additions to factory, 4, Temple Street, for Knibbs, Ltd.; J. E. Kewell, architect, 290, Oxford Road.

Extensions to works, Queen Street, Bradford, for Frances Shaw & Co., Ltd., Cobbett Street; S. Moss, architect, 2, St. Ann's Square.

Reconstruction of works, First Avenue, Trafford Park, for Dunlop Rubber Co., Ltd.; Robert Carlyle & Co., Ltd., contractors, Elsinore Road, Old Trafford, Manchester.

Mansfield. — Works extensions, Rock-Valley, for the Metal Box Co., Ltd., Barringer Wallis & Manners, Ltd.; Cook, Howard and Lane, architects, Brunts Chas, Leeming Street.

Morpeth.—Dairy at Common Farm; J. Wilson, Ltd., builders, Morpeth.

Newark.—Pithead baths at Ollerton Collieries, New Ollerton, near Newark; Architects' Department, Miners' Welfare Central Fund Committee.

Newcastle-on-Tyne.—Large new garage in Percy Street, for G. E. Carr, Ltd.; Marshall, Tweedy & Bourn, architects, Grainger House, Newcastle.

Branch premises at Bewfield Road, for the Newcastle Co-operative Society; C.W.S. Architects' Dept., 90, Westmoreland Road, Newcastle.

Extensions to mineral water factory, Benfield Road, for Johnson and Co.; J. R. Sherwood, architect, 27, Eastfield Avenue, Monkseaton.

Extensions to telegraph shop, Shields Road, for Donkin and Co.; staff architect.

Northampton.—Factory extension, Balfour Road; Northampton Machinery Co., Ltd.

Commercial garage, Bedford Road; N. D. Bell.

Bacon curing factory, St. Katherines Street; W. H. Thomas.

Northfleet.—Additions to Kent Kraft New Mills, Taunton Road; J. B. Lingham.

Penistone. — Houses (34), Silkstone scheme, for R.D.C.; surveyor, Council Offices.

Plymouth. — Wireless relay station, Austin Avenue; Plymouth Rediffusion, Ltd.

Repton. — Rebuilding British Legion Club; Sanders & Son, contractors, High Street, Repton, near Burton-on-Trent.

Rothbury. — Rebuilding the Jubilee Hall; Thomas Muckle and Son, builders, Bridge Street, Rothbury.

Rotherham. — Coleridge Road junior and nursery schools (£12,175), and Whiston Grange open air school (£18,215), for E.C.; borough engineer.

St. Albans.—Fire station, Main Road, London Colney, for R.D.C.; surveyor, Council Offices.

Sheffield.—Houses, Tansley Street and Vauxhall Road, for Ackroyd and Abbott, builders, 61, Studley Road.

Smethwick.—Fire station extensions (£10,478), for T.C.; borough engineer, Town Hall.

Southall. — Dairy premises, Western Road; London Co-operative Society, Ltd., 54, Maryland Street, E.15.

Southampton.—Buildings at the West-end Public Assistance Institution; S. G. Stanton, borough engineer.

South Shields. — Rebuilding the Jamaica Vaults (£6,000); Henderson Bros., contractors, Tyne Street, Tyne Dock, South Shields.

Rebuilding the Scarborough Spa Hotel, King Street, for A. Deuchar, Ltd.; Page, Son and Bradbury, architects, 75, King Street, South Shields.

Stockport.—Licensed premises, junction of Nangreave Road and Lowndes Lane, for Frederick Robinson, Ltd., Unicorn Brewery; A. Guest, resident architect.

Stourport.—Factory extensions, Steatite and Porcelain Products, Ltd.

Uxbridge.—Houses, Violet Farm estate, for U.D.C.; surveyor, Council Offices, High Street.

Wells (NORFOLK). — Houses, for U.D.C.; surveyor, Council Offices, Wells.

Wembley.—New factory at Woodside End; Velvet Crepe Paper Co., Bendon Valley, London, S.W.18.

West Hartlepool. — Buildings near Mainsforth Terrace, for the South Durham Iron and Steel Co., Cargo Fleet Ironworks, Middlesbrough.

Licensed premises, Park Road, for J. W. Cameron and Co., Ltd.; J. W. English, architect, 4, Hart Road, West Hartlepool.

Dairy store, Seaton Lane, for J. Lamplough; Heslop and Johnson, architects, Church Square, West Hartlepool.

Wheathampstead.—Fire station, for St. Albans R.D.C.; surveyor, Council Offices.

Wigan. — Houses, for Heaton and Dennis, builders, 750, Ormskirk Road, Pemberton.

Wimborne.—Fire station, Allendale, for U.D.C.; surveyor, Council Offices.

FORTHCOMING EVENTS

April 19th (Friday).

I.E.E. (*Transmission Section*).—Waldorf Hotel, London, W.C.2. 7 for 7.15 p.m. Informal section dinner. 8.30 p.m. Re-union.

April 20th (Saturday).

Junior Institution of Engineers.—Monico Restaurant, London, W.1. 1 for 1.30 p.m. Annual luncheon.

(*Midland Section*).—James Watt Institute, Birmingham. 2.30 p.m. "Electrical Distribution." By D. Birch.

April 22nd (Monday).

I.E.E. (*North-Eastern Centre*).—The Newe House, Newcastle-on-Tyne. 6.15 p.m. "High-rupturing-capacity Cartridge Fuses, with Special Reference to Short-circuit Performance." By J. W. Gibson.

April 23rd (Tuesday).

Institution of Chemical Engineers.—Geological Society, Burlington House, London, W.1. 5.15 p.m. "A Review of Certain Unit Processes." By J. C. Farrant.

I.E.E. (*Northern Ireland Sub-Centre*).—9, Wellington Place, Belfast. 6 p.m. Informal discussion on I.E.E. Regulations. To be opened by F. W. Parkinson.

I.E.E. (*Scottish Centre*).—Royal Technical College, Glasgow. 6.15 p.m. Annual meeting. 6.30 p.m. "The Trolley-bus." By G. F. Sinclair.

I.E.E. (*Wireless Section*).—Institution, London, W.C.2. 6 p.m. Informal meeting. Discussion on "War-time Standardisation." To be opened by P. R. Coursey.

April 25th (Thursday).

I.E.E.—Institution, London, W.C.2. 6 p.m. 31st Kelvin Lecture. "Thermodynamics and the Coldest Temperatures." By Dr. C. G. Darwin.

Institute of Fuel.—Connaught Rooms, London, W.C.2. 6 p.m. Annual meeting. "Some Food for Thought in Steam Plant Design." By J. N. Dundas Heenan. To be followed by a discussion.

TRADE MARK APPLICATIONS

THE following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from April 10th :—

Melody Maker. No. 604533. Class 9 (IV). Thermionic valve apparatus and parts thereof for radio reception or electrical sound reproduction, and electric batteries for use with such apparatus.—A. C. Cossor, Ltd., Cossor House, Highbury Grove, London, N.5.

Memlo. No. 610150. Class 9 (IV). Electric transformers and switches; and Memlite. No. 610151. Class 11 (IV). Electric lighting fittings—Midland Electric Manufacturing Co., Ltd., M.E.M. Works, Reddings Lane, Tyseley, Birmingham.